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PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

VOLUME XXII.

EDITED BY G. WHARTON SIMPSON, M.A., F.S.A.

Nulla recordanti lux est ingrata.—MARTIAL.

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PREFACE.

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WHILST the Volume to which these lines stand as Preface contains the record of a year of more than usual progress in some respects, it is one which pre-eminently needs no afterwords by way of explanation or comment. It chronicles, indeed, the first phases of a great revolution in the art, a change from the wet collodion process, which, for upwards of twenty years past, has been the all-prevalent method of producing negatives. Dry plate processes have been essentially experimental in their character hitherto ; but during the past year the initial steps have been taken of replacing wet plates by dry ones, even for portraiture in studios. The Volume which we just issue contains the unassuming record of the first step in the great change.

The chief duty of the Editor in this Preface is to thank a host of friends in all parts of the world for aiding him in placing before the photographic world a complete chronicle of the progress of photography in its every phase as art, science, and industry, and for the courtesy and encouragement with which his own labours have been received in the responsible duty of conducting a recognized organ of photography and photographers, especially one accepted with such confidence as has been accorded to the PHOTOGRAPHIC NEWS.

Promising to endeavour to continue worthy of that confidence, and thanking our large and valued circle of contributors, correspondents, and readers, we now wish each and all a prosperous and happy New Year.

January 1st, 1879.

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The Photographic News, January 4, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

The Latest Discovery in Chemistry: Liquefied Oxygen—Improvement in Lichtdruck Printing—Capture of a Criminal in Germany by Aid of Photography—The Paris International Exhibition for 1878.

The Latest Discovery in Chemistry: Liquefied Oxygen.—There are but two elemental gases now known in chemistry: hydrogen and nitrogen. The great triumvirate has at last been dissolved, and chemists are throwing their caps into the air and cheering loudly. It is no longer oxygen, hydrogen, and nitrogen, that constitute gases, we shall have to teach our boys and girls; oxygen has succumbed, and will henceforth be known quite as much as a liquid as a gas. Liquefied oxygen is *un fait accompli*, and henceforth it must be removed from the list of elemental gases. To what other grand discoveries this step will lead us we need not now enquire; it is sufficient to know that we can now turn the subtle gas into a liquid, and employ liquid oxygen in any way we may desire. The discovery was made in Geneva ten days ago by M. Rasul Pictet, in the laboratory of the Society for the Manufacture of Physical Instruments. He encompassed the problem by subjecting the gas to enormous pressure at a very cold temperature. It is well known that carbonic acid can be liquefied and solidified by compression, and it is with the aid of this terribly cold agent, solid carbonic acid, that M. Pictet has been able to produce liquid oxygen. He produced, first of all, solid carbonic acid. A stout tube was filled with this acid, and into it was pushed a tube of smaller diameter. A stream of oxygen passed through the smaller tube, and exuded from the orifice in the form of a liquid. The intense cold from the solid carbonic acid was not, however, enough to produce the change in the oxygen; great pressure, as we have said, was necessary. The oxygen, indeed, was subjected to a pressure of no less than three hundred atmospheres before it consented to become liquid. Not only must we look at this discovery of preparing liquid oxygen as a great stride in chemical science, but it bears out a teaching which has hitherto lacked support, namely, that all bodies are capable of passing through three states, the solid, liquid, and gaseous, according as they are influenced by heat. For a long period the elemental gases, oxygen, nitrogen, and hydrogen, have stood out against this theory, and have been an apparent contradiction to the otherwise universally received law; but now that one of their number has been combated and laid low, the days of the others may be said to be numbered. In the face of the liquefaction of oxygen, nothing can now be said against the theory we have been taught for years. As to the uses to which liquid oxygen may be put, it is not too much to say that a new branch of chemistry will thereby be opened up. Photographers, no doubt, as well as other workers of applied chemistry, if the liquid oxygen can only be kept, will find applications enough, for oxygen plays an important role in the greatest of our photographic reactions. Here is the telegram which conveyed to his brethren in England the first news of Professor Pictet's grand discovery:—*Oxygene liquifie samedi par acides sulfureux et carboniques combines.*

Improvement in Lichtdruck Printing,—An improvement in Lichtdruck printing is said to have been accomplished by Messrs. Schober and Boeckmann, of Carlsruhe, who are enabled to pull no less than 200 impressions from a plate without the latter being moistened meanwhile. In lithographic printing, as most of our readers are aware, it is customary to wet the stone, and to ink it at every impression, and this same thing has hitherto been done in Lichtdruck printing. In fact, the gelatine printing block in the latter case has frequently to be very gently handled, to be carefully moistened with a wet sponge or cloth, and then to be inked up sometimes with two or three inks and rollers. Messrs. Schober and Boeckmann are said to have discovered a means of simplifying the printing process considerably by employing, instead of water, some chemical preparation, which admits, as we have said, of keeping the film moist during the pulling off of no less than 200 copies. In this way a more rapid production of Lichtdruck prints is obviously brought about.

Capture of a Criminal in Germany by Aid of Photography.—In Germany, the photographing of criminals is bearing good fruit, and we are told of a notorious thief, named Silberberg, whose capture at Kiel has been effected by the aid of this measure. As in this country, photographs of criminals and suspected persons are obtained and multiplied by the police, who then distribute to their bureaux throughout the country the copies thus prepared. Silberberg, it seems, enjoyed the reputation of a sort of captain of robbers, who organised bands, and constructed plans of thefts and burglaries, now in this part of the country, now in that. Sometimes he was to be heard of in Berlin, sometimes in other big towns of the Fatherland. He was always travelling, and always eluded the vigilance of his pursuers. At last, a portrait of the man was obtained by the authorities, who set to work to copy it, and did not rest satisfied until the features of the notorious Silberberg had been rendered familiar pretty well to every policeman in the country. Detectives being everywhere on the *qui vive*, the thief was not long in being trapped. At the Kiel station, one day, a traveller bearing a striking resemblance to the robber captain was remarked by a detective, who at once followed up the man, and pounced upon him. The officer's alertness was rewarded, and, strange to say, he came upon Silberberg just as the latter was pocketing a purse containing 1,800 marks, of which he had just relieved some other traveller. The man safely under lock and key, information was sent to the Central Police Office at Berlin, and very soon all doubt was removed as to the identity of the prisoner. In Germany they seem to have established a far more complete system of criminal photography even than in this country, for one State exchanges with the other their photographs, in the same way as friends might do who are forming a family album. Saxony and Bavaria are interested in the criminal members of their neighbours' families as much as the neighbours themselves, and hence an exchange of portraits is carried on, the which, as we have seen, becomes very useful at times.

The Paris International Exhibition for 1878.—The Paris International Exhibition is approaching completion, so far as the building is concerned, and Marshal MacMahon, who visited the works the other day, was informed that all would be ready for the opening day upon the 1st of May. We see that French photographers are being warned in respect to a catalogue which is also stated to be in preparation, and which has not the countenance of the Exhibition Committee. Only one catalogue will be recognised, and that is the official one, and this only will be permitted to be sold in the Exhibition building. It is well that everybody who contemplates exhibiting should know this, so that they may be on their guard in case of their being applied to by unauthorised persons for advertisements or for notices to be duly paid for. The Committee, too, have decided not to permit the sole right of photographing the building and the collection to be vested in any one person or company. Applications were made by several eminent firms of photographers in France, and also, we believe, by an English house, all of which offered to pay heavily for the sole privilege of being able to take pictures inside the building. But one and all have been refused, and any photographer who asks permission, and can satisfy the Committee on certain points, will be permitted to exercise his calling in the building under certain restrictions. The camera will only be permitted early in the morning before the entrance of the general public, except, we suppose, under extraordinary circumstances. Following the lead of other Government establishments in Paris, we should not be surprised if the authorities should only permit the use of dry plates within the building, in which case photographers who are thinking about claiming the privilege to enter should cast about them for a good and trustworthy dry method to fall back upon.

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THE GELATINE EMULSION PROCESS AND THE PREPARATION OF DRIED PELLICLE.

BY THOMAS CHILTON.

It is my intention to lay before you this evening a brief outline of the gelatine emulsion process, at the same time giving the results of my own experience, hoping thereby to further the successful working of the process, and also that some of our number may be incited to give it a trial.

In giving this outline it would be impossible for me to put forward anything like a satisfactory explanation of the process without repeating a good deal of what has been so often and ably recorded in the photographic journals and almanacs. Therefore I hope I shall not be considered tedious whilst I try to give as clear and concise an account as time will permit.

That the process is one worthy of our attention I am fully convinced, possessing, as it does, special advantages, and, it cannot be denied, special drawbacks; but I think it is only fair to expect that as it is more extensively practised and its failures pointed out we may expect better things. To make the emulsion: as to the formulæ there are plenty to choose from; the one I have been in the habit of using was given by "Franklin," in March, 1876, having a slight excess of silver. I find that plates prepared by this emulsion will not keep in good condition beyond three months; if kept longer they lose their creamy tinge, and it is almost impossible to develop without fog. My opinion is that by making an emulsion with bromide in excess very little will be sacrificed, and the keeping of plates and success in development will be more certain. However, I will give the "Franklin" formula, for which any other may be substituted if required.

I will suppose two ounces of emulsion are wanted. Proceed as follows:—Procure an eight or ten-ounce bottle (I used an orange-coloured one), put in one ounce of water, and add twenty grains of ammonium bromide and forty-four grains of gelatine; leave it to soak. If the finely-shredded sample be used, five minutes will be sufficient; if the thicker sample, such as Nelson's patent opaque, then three or four hours will be required. When soaked, immerse the bottle in warm water, and the gelatine will readily dissolve. Now dissolve thirty-six grains of silver nitrate in two drachms of distilled water made warm, and add the silver solution to the bromo-gelatine solution in three or four additions, shaking well after each. The emulsion is now formed, and in order to attain its best condition must be kept in this state for five or six hours, after which it is then ready to have the crystallisable salts removed.

The simplest and most efficient method I consider to be washing, when the bottle plan is employed, for which contrivance we are indebted to "Franklin." The emulsion having been prepared in a good-sized bottle, we have simply to revolve it horizontally under a stream of cold water; in five minutes, or less, the emulsion has sufficiently set on the sides of the bottle. Now let a thistle-headed funnel be suspended from the mouth of the tap, and touching, within an inch or two, the bottom of the bottle; a thin stream of water is poured on, passing down the tube to the bottom of the bottle and out at the top, thus, with a minimum of trouble, washing without loss. Providing the bottle is large enough, any quantity of emulsion may be so washed. In the hot summer weather I have found it necessary to use iced water. After washing four or five hours, the bottle is placed in warm water, and the emulsion redissolved; it will probably measure three or four drachms short of two ounces, which may be made up by adding water or an organifier.

Now filter through cotton wool, taking care to warm the filter, so as not to chill the emulsion and cause prolonged filtration. When the emulsion is filtered it is ready for use, and, if sufficient plates are cleaned, none need be wasted; the plates are cleaned on one side only, and no substratum is required. Before coating, brush over with a hog's-hair brush, and hold the plate over hot water to remove chill, the steaming also facilitating the flow of the emulsion.

If sufficient emulsion be poured on the plates, small ones may be coated with perfect ease; a thin glass rod will be useful to guide the emulsion over large plates. Do not drain too much. It is necessary that the plates be placed perfectly level after coating until set, otherwise uneven films will be the result; the best method is that of having a levelled piece of plate glass shielded from falling dust. A coated plate rapidly sets, and may then be transferred to the drying box. I have brought mine for inspection; it is made from instructions given by Mr. Palmer, with the addition of a chemical thermometer let in the box from the top, by which I can readily ascertain the temperature of heat passing through. The heated air is carried off into the flue of the chimney by means of a tunnel three and a half inches in diameter, made of stiff brown paper, which arrangement adds to the strength of the current of air passing through the box. The space between the bottom shelf and the bottom of the box is two inches, but I would recommend a space of about six inches, owing to the heat which ascends the cone and comes against the bottom shelf, causing it to become very warm, and rendering it useless to dry the plates in. I also think a longer box with one or two shelves would be better, as plates placed on the top shelf but one are considerably longer in drying than those below; the top shelf I never use.

With a temperature of 65° to 75° Fahr. a batch of plates take from five to six hours to dry. I have dried a single plate in an hour and a quarter. I heat the iron cone with a small Bunsen burner; care must be taken to shield it from draughts when burning a low flame, otherwise it may "flop" out and burn at the air-holes, giving off very little heat and a disagreeable smell. The drying being completed, the plates are ready for exposure, and, if kept, they should be protected from damp atmospheres.

I can fully endorse all that has been said in favour of having part beer in the emulsion as a means of conferring density. I use one-fourth, but, at the same time, I think plates prepared from an emulsion containing beer are more liable to blister than those without it. A dried gelatine film is capable of standing a deal of rough usage.

Sometimes a negative will dry with a dull surface, which is caused by imperfect washing after fixing. This dulness may be removed by holding the part affected under a stream of water and lightly rubbing with cotton wool. I have brought a plate showing this defect, part of which has been removed as described.

The exposure generally required in a good light is about fifteen seconds with a single stereo lens of six inches focus. For transparencies about eight seconds are sufficient before a moderate gas flame, distance about six inches. If beer be used in the emulsion a longer exposure is necessary.

To develop, I use Kennett's formula, developing in a dish with a white bottom, and allow the plate to soak in water for two minutes previous to applying the developer.

Having gone through the preparation of the emulsion, I will now give what I consider to be the advantages and drawbacks of the process. Its advantages are—beauty of result, rapidity, cheapness, and absence of obnoxious fumes. I have brought a few negatives showing density and delicacy, the exposures varying from thirteen to twenty-five seconds, using a single lens stop $\frac{f}{24}$—the emulsion having about one-fourth of beer added, and density being obtained by the alkaline method. The cost of preparing five ounces of emulsion does not exceed one shilling. The operation of coating a batch of plates with a collodion emulsion is,

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* Read before the Manchester Photographic Society.

in most cases, attended with rather unpleasant feelings in the throat or eyes—perhaps both, but with gelatine emulsion there are no such effects experienced.

The drawbacks attending the process are—frilling of the film during or after development, the time required for drying plates, and non-keeping properties of the emulsion. The frilling of the film has been, and is still, my greatest difficulty, and is one which has been experienced by most gelatine workers; but I am glad to know there are some who say it is a thing of the past. This proves that it is not a necessary evil, and I hope, ere long, we may get an unfailing receipt for its removal.

Various causes have been assigned for this defect, such as over-heating either in the preparation of the emulsion or during drying of plates, decomposition of the emulsion, keeping plates in a damp atmosphere, using too much gelatine in the formula, and having an acid and an alkali in the film at the same time. I have brought specimens of frilling; also a film which frilled during washing after development, and by a little care was placed on the piece of glass to which it is now attached.

The film is from a 4¼ by 3¼ plate, and now measures 5¾ by 4½. This will give some idea of the extent to which a film may expand, and also show that it may not necessarily be entirely lost. I have noticed that there are less chances of frilling when very cold water is used in the developing and washing, frilling seldom if ever occurring whilst the plate is in the fixing solution. That part of the plate which has taken longest to dry is generally the first part to frill. Epsom salts and methylated alcohol, which have been recommended as cures, are not infallible. I only wish they were.

The time for drying a batch of plates will all depend on the means employed, and as prolonged drying is a certain cause of frilling, this part of the process ought to have every attention. A strong current should be made to pass through the box in order to take off the moist air; this may be readily accomplished by fixing a tube from the outlet of the drying box and carrying it into the flue of the chimney. Also, the moisture in the heated air may, to a great extent, be absorbed, by allowing it to pass over quicklime or other drying agent which may be placed on the bottom of the box.

The non-keeping properties of the emulsion are partly counter-balanced by being able to prepare in a few minutes a fresh lot from dried pellicle, a supply of which should be kept in stock.

The Preparation of Dried Pellicle.—Owing to the non-validity of Kennett's patent (it having been declared void*) we are now at liberty to make use of what is undoubtedly a very convenient method. During the winter months will be the best time to make a pellicle. Not only have we more time to spare, but the operation of washing and pouring out to set are more easily accomplished, and there are less chances of decomposition than in the summer months. The manner of mixing and the after operations are the same as when making the ordinary emulsion.

To make sufficient pellicle for twenty ounces of emulsion, take a quart bottle, and use the following quantities ("Franklin's"):—

Water	5 ounces
Ammonium bromide	200 grains
Gelatine	440 "
Silver nitrate	360 "

The silver to be dissolved in one ounce of distilled water. When the emulsion is made, washed, and redissolved, it must be poured out to set on levelled plate glass; the pellicle should not exceed three-sixteenths of an inch in thickness, and is better if one-eighth.

After having poured out the emulsion, rinse the bottles out with half-an-ounce of water, made warm; this takes up what is left in the bottle, and must be poured out to set also. The emulsion sets almost immediately. The emulsion having set, it is now cut up in pieces about an inch square with a bone or ivory knife, and transferred to frames of network, which are then placed in the drying box (the shelves having been removed). I have a tray of quicklime placed on the bottom of the box. I use two frames of network. The pellicle on the bottom one is dried in six or seven hours with the temperature at 70° to 75° Fahr. I then reverse the frames, and in another six hours the drying is completed. The pellicle must now be weighed; there will be about 770 grains. It may now be kept in a dry place, and used as required. If an ounce of emulsion is wanted, soak thirty-nine or forty grains of the pellicle in one ounce of water for about twenty minutes; then warm, and it will readily dissolve. When perfectly dissolved, filter, and coat the plates.

There is another method which I think will be found useful. I have made the emulsion, but cannot speak definitely, not having had time to complete it. My idea is to use only half the quantity of gelatine in preparing the emulsion, and adding the other half of gelatine (which should be the finely-shredded sample). When dissolving the dried pellicle (if this method be adopted) about twenty-eight grains of the dried pellicle and eleven grains of gelatine will be required per ounce of emulsion. In this way only half the quantity of the gelatine is liable to ill effects in the preparation, and there will consequently be less chance of frilling. I have used the term "warm water," by which I mean water at a temperature of 100° to 110° Fahr. In working this process be careful to use a very non-actinic light.

In conclusion, I hope my remarks on failures will not discourage anyone working the process, but that they may aid in establishing a reliable gelatine process.

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ON THE EDGE-ANGLE AND DIFFUSION OF LIQUIDS ON SOLID BODIES.

BY G. QUINCKE, CORRESPONDING MEMBER.*

In the course of my researches on the phenomena of capillary attraction at the common surface of the liquids (Gott. Nach. 17, 10, 1869), and on the cohesion of saline solutions (Pogg. Ann. 160, p. 337-374, 560-588; 1877), I was also induced to investigate more closely the relations between liquids and solid bodies. The following results have been obtained—

The previously known properties of the common bounding surface of two liquids appear to be possessed also by the common surface of a liquid and a solid body.

The common surface of a solid body (1) and of a liquid (2) has a tendency to become as small as possible, or, there exists in it, so to say, a certain surface-tension independent of its geometrical form, and determined only by the nature of the two substances (1) and (2).

The size of an edge-angle† of a solid body (1), and of a liquid (2), which are both bounded by a fluid (3), is only determined by the nature of the three substances, and is independent of the geometrical form of the surface.

The chief principle of the theory of capillary attraction laid down by Thomas Young, that the edge-angle of the free surface of a solid body and of a liquid is a constant quantity, is a particular case of the principle just enunciated when the fluid (3) is atmospheric air.

The edge-angle may be indirectly deduced from the form of flat drops and of bubbles, or may be measured directly by means of reflected light.

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* We are not aware that the patent has been declared void by the Patent authorities.—Ed. P.N.

* *Photographic Society's Journal.*

†[There is no exact equivalent in English for the word which has been translated as edge-angle. The edge-angle of a drop on the surface of a plate is the angle the free surface of the drop nearest the plate makes with the surface of the plate.—Editor.]

The theoretical edge-angle of the free surface of different fluids, as water, alcohol, &c., or as solutions of various salts in water or in alcohol, upon pure glass, crystal, or metal surfaces, appears to be 0°. The fluid is then dispersed or spread out over the clean surface of the solid body. When the edge-angle has, as is commonly the case, a greater value, the surface of the solid is covered with an imperceptibly thin film of some foreign body, and the edge-angle varies with the thickness of this film. This thickness, however, cannot have more than a fixed maximum value, which is as large as, or larger than, the radius of the sphere of action of the molecular forces. The thin film, adhering to the surface of the solid body, may be either a liquid or a gaseous substance. It can also consist of the overlying fluid itself, which may be inferred from the so-called creeping of saline solutions, or from the electrical currents on the surface of the solid body, or occasionally from the interference colour of the light reflected from the fluid.

The imperceptibly thin films of the same fluid have properties varying with the duration and nature of their formation, or according to the description of the solid body to which they adhere. Drops of water quickly formed, for instance, spread out over the surface of clear glass more easily than those slowly formed. These inappreciably thin films of foreign substances seem to be the cause of the differences between theory and observation in the determination of the surface tension at the common surface of fluids and solid bodies. When the edge-angle is 0°, or impossible, the fluid extends itself over the surface of the solid body.

With fluids which are capable of mixing under any circumstances, the fluid with the lesser surface tension expels, or pushes aside, the fluid with the greater surface tension. This surface tension and the possible expulsion, or pushing aside, alter, however, with the nature of the solid substance. This completes Brück's theory[†] of surface diffusion along a rigid wall. The presence of other fluids, and particularly of atmospheric air, considerably modifies the dispersion of a fluid on a rigid wall.

The breath-images of Moser[‡] and Waide[§], obtained by means of steam; *the light-images of Daguerre[‖] by mercurial vapour;* the electrical breath-images and breath-figures of G. Karsten[¶] and Riess[**] by the vapour of water, mercury, and iodine, are all explained by the edge-angle of the fluid, which depends on the imperceptibly thin film on the surface of the solid body.

ON A PROCESS FOR THE ELECTRICAL DEPOSITION OF METALS, AND FOR CONSTRUCTING METAL-COVERED GLASS SPECULA.

BY PROF. ARTHUR W. WRIGHT, YALE COLLEGE.[*]

In a paper by the writer, published in the *American Journal of Science and Arts*, January, 1877, an account was given of a method of producing metallic films upon the inner surface of exhausted glass tubes, by the action of a succession of energetic electrical discharges. The thickness of these films could be varied from a tenuity such that the coating barely gave indications of a metallic lustre, and scarcely dimmed the intensity of transmitted light, to the point where perfect opacity was attained, by simply continuing the action of the current for a shorter or longer time. They were produced by forming the negative electrode of the metal to be deposited, exhausting the tube, and passing through it the current from an induction coil. The metallic coatings thus obtained, as seen from the exterior, were very brilliant, but the condition of the inner surface was not readily observed, and the nature of the process made it seem probable that they possessed a dull, or even frosted surface. With a view to obtain the films in a form better suited for examination, a modification of the apparatus was contrived, by which they could be deposited upon pieces of plane glass. At first this object was attained by inserting narrow slips of glass into the tube by the side of the electrode, in the manner suggested in my former paper, and very good results were gained. But, as the nearer portion of the plate received a larger share of the metal, the thickness of the deposit was not uniform, and it was found necessary to construct a special apparatus in which the relative positions of the plate and the electrode could be varied, so as to give the latter an equal action upon all parts of the surface to be covered. The plan employed was as described in the following paragraphs.

A rather thick-walled glass globe, about 7 centimetres in diameter, blown upon the end of a tube 25 centimetres long, and 15 m.m. in diameter, was used to form the receiver. The top of the globe, opposite the tube, was cut off, so as to form an opening 40 m.m. in diameter, and the edge ground flat, in a plane perpendicular to the axis of the tube. The end of the latter was drawn somewhat smaller in a gas flame, and a glass stop-cock attached to it with cement. A little way above this, a platinum wire was fused into the glass to serve as the positive electrode. The cover of the vessel was made by cutting from a similar globe a portion corresponding in size to the part removed, but with the neck attached, the two pieces being carefully ground so as to fit closely. When they were placed together, a little cement applied to the outside along the line of juncture rendered the joint perfectly air-tight. The tube or neck of the cover was five centimetres long, and was also somewhat reduced at the extremity by drawing it smaller. Into this was cemented a small and thick-walled tube, extending to a point near the centre of the globe. A platinum wire was placed in this tube, and was fused in at the top, enough being left projecting to form a small loop for the attachment of the wire from the coil. The inner end of the wire terminated at about one centimetre from the lower end of the glass tube. Into the latter was slipped a wire of the metal to be deposited, which, in all cases, was the negative electrode—the part within the tube being long enough to make good contact with the platinum wire, and being bent somewhat so as to cause it to retain its place by friction. In some of the experiments a different cover was used, made from a glass funnel, the neck of which was left somewhat longer, to afford more room for the swinging electrode, as described below, and the tube carrying the latter was fitted into the top by grinding so as to make an air-tight joint.

For the support of the plate a small watch-glass, about three centimetres in diameter, was employed, to one edge of which a thread of glass was fused by a blowpipe flame, and then bent so as to form a loop by which it could be suspended like the pan of a balance. A small hook of glass was also attached to the side of the thick tube, carrying the electrode, and upon this the pan was hung, the loop being so formed as to allow it to swing freely in all directions. The pan, when in place, was about 15 m.m. below the end of the tube from which the electrode projected, the latter being adjusted to the proper distance by sliding it up or down in its support as occasion required. By slightly inclining the globe the extremity of the wire could thus be readily brought over any point of the plate. In some of the experiments the plate was stationary, being held in a little tripod of glass threads, or simply laid upon the bottom of the globe. In these cases the tube holding the electrode was jointed near the top, the two portions being connected by a hook and loop of platinum or magnesium wire. It could thus be made to traverse all parts of the plate by giving suitable movements to the globe.

[†] Pogg. Annal., 58, p. 82, 1843. [‡] Pogg. Annal., 56, p. 177; 57, p. 1; 1842 [§] Pogg. Annual., 59, p. 255, 1843. [‖] Comp. Rend., IX., p. 257, 1839. [¶] Pogg. Annal., 57, p. 493, 1842. [**] Riess, Riebungs-Elektricitat, 11., p. 224.

[*] *American Journal of Science and Arts.*

When adjusted and closed the receiver was attached to the Sprengel pump. By means of a small air-pump of the ordinary construction, connected with this by a stop-cock and flexible tube, the whole apparatus was exhausted as far as possible, and then dry hydrogen admitted, this being repeated two or three times in order to remove the air and moisture. The process of exhaustion was then completed with the mercury pump. The degree of rarefaction required varied somewhat with the metal to be deposited, but was rarely above 2·5 m.m. For platinum the best results were obtained when it was from 1·5 to 1·75 m.m. The use of hydrogen is not in all cases necessary, as some of the metals can be deposited perfectly well with only air in the receiver. This is especially the case with gold, but platinum, although ordinarily not easily combined with oxygen, becomes tarnished with a film of what apparently is the blue oxide, unless the air is removed. The electrode itself was formed of a small wire, usually not more than one-fourth of a millimetre in thickness, bent at the end into a circle 3 or 4 m.m. in diameter, the plane of which was perpendicular to the straight portion of the wire entering the glass tube, and parallel with the surface of the glass plate situated beneath it. Its distance from the latter was generally about 3 m.m., though considerable variations were possible. When it is farther away the process of deposition goes on much more slowly, though the results are in most cases quite as good as when it is nearer. After the process of exhaustion was completed, the stop-cock was closed, and the apparatus removed from the pump, for greater convenience of manipulation in applying the current.

The electrical apparatus employed consisted of an induction coil capable of giving sparks three or four centimetres in length, and a battery, the power of which could be varied according to circumstances. It consisted usually of pint Grove cells, from three to six in number, not completely filled, or charged with rather weak acid, and a plunge battery of five cells, of which one two, or more were used, as occasion required, the whole being joined in a continuous circuit. By immersing the plates of the plunge battery more or less, as well as by varying the number in the circuit, the strength of the current could readily be changed within the limits desired. The various metals required currents of different strength, and the power best suited to each had to be determined by trial. It was found advisable in most cases to regulate it so that the temperature of the electrode was below that of a red heat, or such as barely to redden it. Of course, with the more fusible metals it was necessarily much lower than this. The metal is actually volatilised by the discharge, as is shown by the fact that the characteristic lines of its spectrum may be seen with a spectroscope, and the film is formed by the condensation of its vapour upon the cooler glass surface. For the production of films with brilliant surfaces, the strength of the current must not be great enough to give the discharge a disruptive character, as this separates some of the metal in the form of powder.

The primary object of the experiments was to obtain films of the different metals upon thin pieces of flat glass for the purpose of investigating some of their optical characters. The apparatus proved to be perfectly successful in its operation, and beautiful films of gold, silver, platinum, and bismuth were obtained with ease and certainty. As has been mentioned, it seemed probable that the surface of deposit would be dull, but the first trial showed that this anticipation was incorrect, and the films, when removed from the receiver, exhibited surfaces of exquisite perfection and the most brilliant polish. They can only be compared to the surface of clean liquid mercury, far surpassing in lustre anything that can be obtained by the ordinary methods of polishing.

(*To be continued.*)

PHOTO-ASTRONOMY.

BY M. JANSSEN.*

I have the honour to communicate to the Academy a first result of some researches which I have been conducting with solar photographs of thirty centimetres diameter, upon which I have been successful in obtaining details upon the surface of the luminary. I will not now stop to speak of the granulation which the surface of these photographs of the sun show; I will come back to that question hereafter, which touches upon the dispute as to the form and dimensions of the photosphere. At present I would point to the following facts:—

An attentive examination of the photographs shows that the surface of the photosphere has not an uniform constitution throughout, but that it is divided into a series of figures or configurations more or less distant from one another, and presents a particular constitution of its own. The outline of these figures is more or less rounded; sometimes they are in some sort rectilinear, and approach usually to a polygon in shape. The dimensions of these figures are very variable. They attain sometimes to a diameter of a minute and a half.

While in the intervals between the figures or configurations of which I have spoken the grain is clear and well marked, although varying much in size, in the interior the grain is half effaced, drawn out, and tortuous. Generally, indeed, the grain has disappeared to give place to lines of matter which replace the granulation. Everything indicates that in the spaces the photospheric matter is subject to violent movements which have confounded the granular elements.

I will not touch to-day upon the consequences of this fact, which tells us something of solar activity, and shows, as I have said some time since, that this activity in the photosphere is always very great, although there is no trace of it upon the surface.

The photospheric net could not have been discovered by the optical means which are employed for observation. In fact, in order to discover the phenomena upon the photographs of the sun in my possession, it is imperative to employ a magnifier, which allows one to see a certain specific amount of the photograph at one time. Then, if the enlarging power is suitable for the purpose, if the impression is very pure, and particularly if the image has been properly exposed, it is possible to see that the granulation has not always the same clearness, that the grain portions which are clearly shown appear like currents which circulate in such a way as to circumscribe the spaces when the phenomena present the aspect I have just described. To observe the fact, it is necessary, as I say, to embrace a notable portion of the solar disc, and it is quite impossible to realise the circumstances, therefore, when the luminary is looked at with a very powerful instrument, the field of which is, by reason of its power, very limited. In these conditions it is possible to see that there are portions where the granulations cease to be clear, or even visible; but it is impossible to guess even that this fact is a bit of a general system.

I may add that, so far as the photographs are concerned, it is necessary to examine several clichés in order to make quite sure of the network of which I have spoken.

Mr. Warren de la Rue, during a visit with which he honoured me at Meudon, was struck on examining one of my photographs with a magnifier, to see how this granulation was effaced in some parts of the solar photograph, where evident traces of a very violent movement was visible. His high skill in such matters at once permitted Mr. Warren de la Rue to verify my assertion; and I was enabled by a reference to my series of photographs to prove to him that the phenomenon was a general one, and connected with the solar system.

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* **Read before the Paris Academy of Science.**

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PHOTOGRAPHY IN 1877.

The annals of photography during the past year have been uneventful. The growth of the art has been similar to that of a tree. It has flourished: and foliage, blossom, and fruit have in their due season succeeded each other. Now, when mid-winter has come, the tree has probably extended its branches and its roots further afield; but it looks much the same tree which it did last Christmas time. So with photography: whilst there have been undoubted progress and extended applications, there are no especial changes in the aspects of the art. There is unquestionably appreciable improvement in the general practice of photography, and gains of various kinds have been secured in the practice of the art, but no great revolution, equivalent, say, to the discovery of bichromate of potash as a photographic agent, the use of collodion for negatives, and of carbon for printing, has been placed on record during the year.

Amongst the subjects which have chiefly absorbed the attention of photographers publicly during the year, may be specially mentioned the defects of the negative silver bath, the preparation and working of bromide of silver emulsions, and various phases of carbon printing. The nitrate bath and its troubles formed the subject of a prolonged discussion at the Photographic Society and in the journals, but not much new light was shed on the subject. Various old and empirical remedies were re-stated, and some of them received the endorsement of able men, and the value of nitrate of baryta for the removal of pinholes caused by sulphate of silver (as suggested in our pages some years ago) was fully recognised and confirmed. The use of bromide of silver emulsions for the purpose of getting rid of the nitrate bath and its troubles has received much attention from dry-plate workers, chiefly amongst amateurs, and there has been much discussion as to the best mode of getting rid of the tendency to spots common in many emulsions. An interesting and valuable feature of bromide emulsion plates was pointed out by Captain Abney, who has shown that one of the sensitive plates which had been exposed in the camera, or even in open daylight, might again be resensitized by different agents, preferably a solution of a bromide. The analogy between the bromide of silver plate and the old Daguerreotype was thus shown, as it was well known to old Daguerreotypists that an exposed plate might have the result of the action of light quite destroyed, and sensitiveness restored, by submitting the plate again for a few moments to the fumes of iodine. Emulsions of bromide of silver, both in collodion and in gelatine, are found in experienced hands to give good results, but from some unexplained cause the emulsion processes seem to present many difficulties to beginners and inexperienced photographers.

The question of carbon printing has occupied considerable attention amongst photographers during the year, and steady progress in its adoption appears to have prevailed, a much larger number of portraitists adopting this mode of printing in their regular business operations than at any former period. Some important improvements have been patented during the year by Mr. J. R. Johnson, to whom is due the mode of mounting for development without adhesive matter. The improved methods have for their aim increased beauty of colour, combined with permanence, so as to exclude the use of fugitive tints and unstable pigments in the tissue; increased delicacy and vigour in the gradations secured by the simple assignment of vigorous layers of pigment for the deepest colours, and delicate tints for the tender half tones; and, finally, an attempt to give a translucent effect, like printing on porcelain, to the ordinary carbon print on paper. The practice of using carbon tissue on which to produce an image by direct action of light with the aid of a solar camera has been carried out by Dr. Van Monckhoven with great success during the year. Mr. Swan was successful in some similar attempts some years ago. A method of successfully enlarging on carbon tissue by the aid of artificial light is completed, and will shortly be introduced to the public.

A very successful application of the electric light to purposes of portraiture has been made by Mr. Vanderweyde, who, by the aid of a large dioptric lens, bathes the sitter in a flood of actinic light, obtaining well lighted negatives with a brief exposure. Perfectly successful portraits by day or night are the result.

Photo-mechanical printing processes have progressed in excellency, and in extent of application. The Woodbury process has been brought to a great degree of perfection, quite equalling—and, in some cases, surpassing—silver printing. Mr. Woodbury's process of photo-engraving, as worked out by Messrs. Goupil, has been brought to a high state of perfection. Photo-collographic processes are worked with great success, and are largely adopted where large numbers are required. The examples exhibited at the late exhibition by the Autotype Company are exceedingly perfect.

Whilst especial novelties have not been numerous, a good deal of work has been done on old lines, and much general improvement secured. The value of supplementary light has been more tested and better understood. Modes of developing and intensifying have been extended and improved. Retouching has been reduced with much advantage, and improvement generally has been manifest in ordinary work. Photographic portraiture has improved in general quality. Freshness in posing and lighting have been more frequently seen.

The exhibitions of the year have been successful. That held by the Edinburgh Photographic Society at the commencement of the year was regarded as one of the largest and most interesting displays of matters of photographic interest ever held. The exhibition held in connection with the Photographic Society of Great Britain was a very successful exhibition, both in excellence and extent of contributions, and in attendance and appreciation on the part of visitors. A new feature in the appointment of the jury of awards was tried. Two painters, members of the Royal Academy of Arts, were invited to take part in assigning the medals of honour. The plan did not entirely succeed in its aim, which was to check grumbling as to the awards. Complaints, as usual, were rife as to the eccentricity, if not unfairness, of some of the awards, and in this, with some apparent reason. Photographic societies remain as they were at the beginning of the year—no more, no less, and all active.

Increased importance is attached to the value of photography as an aid to astronomical observation. Its importance in obtaining records of the varying aspects of the sun has been recognised by Lord Salisbury, who has sent to India a trained observer to secure daily photographs of the sun, with a view, if possible, to trace any connection between the periodicity of sun spots, and the regular recurrence of Indian famines. It has been ascertained that sight is really a photographic operation, and an image may, by special care, be preserved on the retina after death.

Amongst the roll of photographers removed by death during the year, the name of Fox Talbot is the most distinguished. Discoverer of a photographic process contemporary with that of Daguerre, the world is indebted to Mr. Talbot for the plan of taking a negative capable of yielding many impressions, and of the method of printing therefrom, which remains, with modifications, the method in use until this day.

M. JANSSEN'S SOLAR DISCOVERIES.

The last solar discoveries of M. Janssen, the well-known French astronomer, are of more than usual importance. Our readers may remember that M. Janssen has only lately been entrusted by the French Government with a photo-astronomical observatory at Meudon, but he has worked so assiduously that already many important results have issued from his labours.

M. Janssen proceeded to Japan at the time of the Transit of Venus, and on his return he was permitted to put up the same sheds and huts, which had served him so well in the far East, upon the Buttes Montmartre overlooking Paris, where he made daily observations of the sun. His perseverance in the cause of science at last had its effect on the French Government, and the Chateau de Meudon (an environ of Paris, like Greenwich is a suburb of London) being vacant, the building and terrace were handed over to M. Janssen as an astronomical observatory. The building was more than vacant; only its four walls were standing, for, like St. Cloud, Meudon had been a victim of the Franco-German war.

Here M. Janssen took up his quarters at the end of last year, moving his instruments and apparatus from their rough shelter on the Buttes Montmartre. He arranged not only to take daily photographs of the solar orb, but during a certain period engaged actually to take pictures every hour, so long as the sun was visible. This was to ascertain whether certain markings and phenomena that had been seen against the sun's disc were so-called spots, or inter-Mercurial planets, and it was in the end mainly due to M. Janssen's pictures, taken hour after hour, that the dispute was finally settled, and the phenomena set down as being connected with the photosphere itself.

M. Janssen's present discovery has to do with the sun pictures he is so skilful in taking. In a word, he has succeeded in securing what photographers would call half-tone upon the solar orb. His pictures of the sun are no more simple discs of glaring white, broken perhaps here and there with a patch to signify a sun spot, but on careful examination one can actually see a grain upon the solar surface. Nay, more; in some parts there is, we are told, a grain similar to that of fine rice grains, while in other portions we have striæ or marks like willow leaves. These striæ markings, too, were said to undergo change if picture after picture is examined, and they are moreover of such a character as to bear witness of constant disturbance in the photosphere or envelope of the solar system. It is, of course, too early to speculate to any extent upon the phenomena, and a careful study of them will be necessary before deducing any theories; but all will understand that we have here the record of a phenomenon—actual proof, in fact, of an action taking place—of which, before, we could only guess the existence.

FRENCH CORRESPONDENCE.

How to Light Dark Rooms or Laboratories—Appert Varnish—Chrysoidine Paper—Chromate of Lead—M. Durand's Experiments—Boivin's Dry Plate Experiments—How to Make Dry Collodion Films Extra Sensitive—Heliographic Work in Half-tone—Rodrique's Mechanical Printing Processes.

The question as to the best mode of lighting dark-rooms and laboratories in which bromide of emulsion is prepared—one of the most sensitive compounds with which we are acquainted—is one which has occupied the attention of many operators, and has given rise to various interesting experiments. I have already made known, some months ago, to the readers of the Photographic News, the circumstance of MM. Appert, well-known glass manufacturers, having submitted to the French Photographic Society various apparatus, destined to intercept the photogenic rays. A chemist, M. Bardy, has now followed up the matter, and he calls attention to the colouring matter extracted from oil, and known by the name of chrysoidine.

An amateur who occupies himself a great deal with emulsions, and especially with that prepared with gelatine, M. Durand, of Saint Etienne, has lately taken up the study also, not only of anti-photogenic bodies, but of others which enjoy equally the faculty of absorbing the active rays, and which have not yet been utilised to this end. I think the readers of the Photographic News will be interested to learn something of the experiments of which this gentleman has recently given me an account.

M. Durand sent me five little plates of glass, prepared with the ordinary gelatine—bromide pellicle. No. 1 is a positive, obtained by exposing the plate for twenty minutes behind a cliché, in the presence of a candle screened behind some glass made by MM. Appert. The image is perfectly visible. No. 2 was exposed in the presence of a lamp, also surrounded by Appert glass, in which the wick had been lowered considerably; despite this precaution, however, there was a well-marked image, although less visible than in the former case.

No. 3 plate had no trace of an image upon it. This time the experiment was conducted with a candle surrounded by a sheet of paper treated with chrysoidine. The chrysoidine paper was in the form of a roll, and above was an oblique cone of ordinary brown paper, to prevent any reflection of white light from the ceiling of the laboratory.

No. 4 did not present, in like manner, any trace of an image. The film in this case had been exposed for twenty minutes to the light of a candle surrounded by a glass globe which had been coated very roughly with chromate of lead diluted with alcohol. If actinic rays are intercepted by a film of chromate of lead, the light which penetrates is much more vivid than that coming through the Appert glass or chrysoidine paper—another advantage of some importance.

Under the same conditions, only that the exposure was prolonged to forty minutes, M. Durand obtained upon No. 5 plate a very distinct image. The reason of this, he thinks, is due in a great measure to the irregularity of the film of chromate of lead. M. Durand proposes to continue his experiments, and to prepare the lead film in as uniform a manner as in the case of the other two anti-photogenic screens, and he will carry out matters as if the plates were being developed in the ordinary manner.

In the meantime, M. Durand thinks we may well draw the following conclusions from the results he has already obtained:—1. It is prudent when working with a gelatino-bromide film not to employ the glass or varnish of Appert which are suitable only for photographic compounds of a less sensitive nature. 2. Operators may consider themselves free from dangers of fogging (so far as the ordinary pellicle is concerned) if they make use of paper prepared with chrysoidine. 3. Finally, without presenting the same guarantee of security as paper prepared with chrysoidine, chromate of lead varnish has the advantage of being more anti-photogenic, and of yielding, at the same time, a more intense and less fatiguing light.

It would be useful if others would conduct the same or parallel experiments to those of M. Durand.

M. Boivin, who still occupies himself in improving the dry collodion process, and especially that point which relates to the sensitiveness of the plates, writes to us, giving a certain means whereby the period of exposure may be considerably shortened.

The method consists in pouring iodised ether upon a plate prepared with iodide of silver (as in the processes of Poitevin, Taupenot, &c.), before the definite sensitization of the plate; the ether is allowed to evaporate a little, and then the plate is plunged into the nitrate of silver bath. You proceed then in the ordinary manner.

According to M. Boivin, plates which have been subjected to this treatment are not only much more sensitive, but they yield clichés more dense, which are exempt from fogging and other defects.

The preparation of the plates in this way is very simple, for it suffices to put a few decigrammes of iodine (in scales) in 100 grammes of ether. In this way a spongy character is given to the film which permits the silver bath to penetrate more deeply into the collodion, and the sensitiveness of the latter becomes, thereupon, far more energetic. Moreover, the molecular condition of the iodide of silver is thereby materially changed; it is more at the surface of the film, and the result is that in development it is more rapidly acted upon by the reducing solutions employed as developer.

Mr. J. J. Rodrigues, who occcupies an important post in the State Paper Office of Portugal at Lisbon, has forwarded me a communication in which he gives an account of the photographic service of which he is directer. In his department heliographic and typographic work are both executed, and he makes known a method by which half tone may be secured in these mechanical printing processes. You begin by making an engraved plate, that is to say, a plate in which the image is formed in hollows. To do this, a mixture of gelatine and bichromate of ammonia is prepared, which, dissolved in water and with red chalk, is spread over a copper plate which has been treated first of all with finely-powdered resin. The film is exposed under a positive cliche secured by means of a dry collodion plate. The image *in intaglio* having thus been secured, it is put on transfer paper, and transferred to a zinc plate; the etching is then proceeded with, and an engraved plate produced from which impressions can be pulled in a typographic press.

Another process which is employed by M. Rodrigues in the photographic service of the Portugal Government, and which that gentleman recommends to the attention of experimenters having more time at their disposal to work out than he himself possesses, is the following:—A zinc plate is covered with a film of bitumen of Judea, the following mixture being made:—

Common benzole	... ...	100 grammes
Essence of lavender ...	...	3 "
Bitumen of Judea ...	...	8 "

Upon this film is poured some spirit varnish which does not give a very thick film. Before the surface has well set, it is powdered over with fine plumbago, as engravers cover their etchings with resin. The zinc plate having been treated after this operation, the plumbago remains sticking to the varnish surface. The film is exposed to light under a cliche, and the surface then washed with alcohol, which removes the superficial varnish, and carries away the grains of plumbago. The development is then conducted by means of essence of turpentine. In this case a grain is formed all over the plate by the finely-divided plumbago which covered it during the exposure to light. The bitumen surface of the image thus presents a multitude of fine points, which allow of the production of an engraved plate. ERNEST LACAN.

A WESTERN ADVENTURE.

BY NORMAN MAY.

It had been a day of hard work, and we were very tired. We had just returned from photographing some frozen falls on a river—or, in western parlance, a "creek,"—about three miles distant, and though there were four of us, dragging the heavily-laden lobogan over the rolling prairie on a foot or so of snow (into which, having no snow-shoes on, we sank at every step) was a wearying task.

An old grey wolf—grown bolder by the cold and hunger—had followed us at a respectable distance, and this led the conversation (during our supper of wheaten cakes and bacon) to turn on hunting, narrow escapes, and kindred subjects.

Harry Harvey related a desperate encounter he had with some of those immense rattlesnakes—so common to the harvest fields of northern Iowa; and George amused us by a recital of his narrow escape from being perfumed by a skunk.

Harry was a fine specimen of the rough Western farmer, standing considerably over six feet in height, and with a devil-may-care look—so common to men situated in a half-civilized region, and far from friends or social ties.

He rented the 120 acres in one corner of which stood his log shanty, and where he (being unmarried) kept "bachelor's hall." Having been unable to obtain a bedstead ready-made of the dimensions required for his long form, Harry made one himself, eight feet in length and six broad. That accommodated Frank Rodd, George Williams, and himself in comfort, and that night I managed to squeeze in too.

The wind had risen since our return, and, as we turned in, howled and whistled about the log shanty; and the laughing and yelling of the wolves in the distant ravine served only to make the night more desolate, and our bed by contrast more comfortable.

We had been asleep some considerable time, when we were simultaneously wakened by a most unearthly noise on the roof—a mixture of howling, shrieking, and jumping on the shingles, which, intensified by the wind, made us all wide awake in an instant. Speculations were made as to what it could possibly be. A bear, which at first we thought might have been attracted by the smell of fried bacon ascending the stove pipe, would not make such a horrible noise as that, and we didn't see how wolves could climb on to the roof, especially as it was covered with ice, and very slippery.

Not many minutes were wasted in thinking or speculating, but we all quickly jumped out of bed and made for the door, Frank carrying the only loaded rifle. The string which did duty for a lock was quietly unfastened, and the door swung open. Just then a blast of icy coldness sent the driving snow over our unprotected legs and bodies, so scantily clad in a single garment. Our ardour was somewhat cooled as we stood there shivering, but the strangely horrible noise was still making night hideous, so pressing forward, we stood in the snow and cautiously peering from under the eaves, we saw, for a few moments, nothing.

The night was intensely dark, and though the snow in some measure relieved it, yet nothing was distinguishable at a distance of more than a few inches. We stood and shivered with cold, but could see nothing, till, on Frank accidentally making a noise with his gun, we all saw at once, peeping over the ridge, a pair of luminous eyes glaring at us, shining like balls of fire in the plutonic blackness. "Now, Frank, now's your time; fire!" and the words were hardly out of Harry's mouth, ere the crack of the rifle resounded, and we had the satisfaction of hearing our mysterious visitor go sliding and sprawling over the slippery shingles, and with a dull thud, burying itself in the snow-drift behind the shanty.

Another keen blast sending the searching snow over us, we beat a precipitate retreat, leaving the wounded or dead animal till daylight should allow us to make a more comfortable survey. Glad enough we were to turn into the warm

blankets again, speculations being indulged in till comparative quietness closed our weary eyes, and we slept undisturbed till daylight streamed through the only window Not much time was spent in preparatory stretching and yawning, but we all quickley dressed; and trampling through the snow we reached the drift wherein lay imbedded our unwelcome and mysterious spoil. Harry shovelled away the snow, and with every spadeful our interest grew deeper, till at last something solid was struck. At last we were coming to it; one more spadeful, and exposed to our half amused, but still wholly sorrowful gaze, lay—our tabby cat.

Poor pussy had, with a particular friend, been indulging in one of those nocturnal carousals her species are wont to delight in, and while thus engaged had fallen a victim to our imagination, and Frank's rifle.

Silently we gazed on it for a minute or two, then a sort of half forced laugh came from all except Harry, who knew too well that he should sadly miss her; but, without putting down the spade, he thoughtfully dug a grave in the solid earth for poor puss.

We mutually agreed to say nothing about the incident; but somehow the story leaked out, and "Who shot the tabby?" brought but a sickly smile to the thoughtful faces of "The cat hunters."

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GOLD IN EMULSION.

BY HENRY J. NEWTON.*

Referring to the increased sensitiveness obtained by the addition of gold, Mr. Newton says:—

The gold I used was the commercial article, and the solution decidedly acid. I found that chloride of platinum produced increased sensitiveness if used quite acid, when the opposite effect was the result if used alkaline. I have never tried the gold in an alkaline condition, and am, therefore, unable to say whether the effect under this condition is the same as with chloride of platinum.

With emulsion as I construct it, and the gold used as I use it, I should think there could be very little chance for any material variation in results. It has been quite thoroughly tested by some of our best and most practical workers here, and with uniform results in its favour, in increasing the sensitiveness at least one-third.

Formula for Collodion..

Alcohol	2½	ounces
Ether	6	,,
Wood naphtha	1½	,,
Cotton	8	grs. to the oz.
Bromide of cadmium	12	,,

To make the emulsion, add eighteen grains of fused nitrate of silver to the ounce in boiling alcohol. This gives three grains of silver in excess. When the excess of silver has acted upon the organic matter of the collodion for about eight hours it is converted into a chloride with hydrochloric acid. It reaches its maximum point of sensitiveness in ten or twelve hours, and usually enters the foggy condition in that time, and it requires a week or more to work clear after adding the acid, if left that length of time. The free silver can be permitted to act longer on the collodion when hydrochloric acid is used to convert it into a chloride, than when the chloride of cobalt or calcium is used.

I determine the strength of my hydrochloric acid by dissolving ten grains of nitrate of silver in half an ounce of water, and, with a dropping-tube, which I never use for any other purpose, drop in the acid until the silver is all converted into a chloride. After having determined the number of drops required to convert ten grains of silver nitrate into a chloride, I keep this sample of acid for this particular use.

This is necessary from the fact that hydrochloric acid varies somewhat in the volume of chlorine which it contains. I usually add a few drops more than necessary to convert all the silver. To make sure that all the free silver has been removed, I flow some of the emulsion on clean glass and expose to the light for a short time, and then apply some of the ordinary iron developer. If any free silver remains it will discolour under the action of the iron, and acid should be added until no change is produced by the combined action of light and the iron developer.

Emulsion made in this way should work clear the next day after compounding, but will improve for a week, and will be found to change very little in a year. The sensitiveness can be increased by increasing the quantity of silver. Twenty grains instead of eighteen will add to its sensitiveness. I should prefer in this experiment to have the formula as given strictly adhered to. The use of the wood naphtha makes the solution of the cotton more complete, and therefore a more even-flowing emulsion.

This emulsion cannot be used successfully with a strong preservative. The preservative to be used is compounded as follows:—

Water	12	ounces
Syrup of squills	1	drachm
Tincture of nux vomica	1	,,
Laudanum	1	,,

Let this stand twenty-four hours, and filter. This preservative can be used for months. It is not absolutely necessary to let it stand twenty-four hours, as it will give good results immediately after compounding, but I think it gives better after a little age.

Plates prepared with this emulsion should not be washed before immersing in this preservative, but should be put into it as soon as sufficiently set, and when the greasy lines are washed off it is ready to be removed, and can be set away to dry or can be used wet. In my experiments I always use them wet; they are, however, more sensitive when dry.

To develop, make a solution of—

Concentrated ammonia	¼	ounce
Water	¾	,,
Bromide of ammonia	10	grains.

This is stock-bottle No. 1. When ready to develop, dissolve in one ounce of water from two to six grains of pyrogallic acid; it is not very material about the strength of the pyro-solution, but it must be in water, as the alcoholic solution will not give satisfactory results with this mode of developing plates prepared with this emulsion.

After the plate has been exposed and washed under the tap, flow it with sufficient of the pyro-solution to cover it well, flow off and on until the outlines of the image appear; then pour the pyro into a vial containing six or eight drops of solution No. 1, and reflow the plate, when the required intensity will immediately be attained.

Two drops of a solution of chloride of gold, eight grains to one ounce of water in eight ounces of emulsion, makes a marked difference of sensitiveness.

My first experiments with the gold solution on emulsion plates were made as follows:—After flowing a plate with emulsion, I washed it with clean water, and flowed one-half of it with water containing a few drops of the gold solution, then exposed and developed.

If the dry plate worker will treat a plate in this way, and use for the purpose—

Water	12	ounces
Gold solution	1	drop,

he will soon discover the potency of the chloride of gold on an emulsion film. If he will add one grain of the iodide of potassium to twelve ounces of water, he will find that this small quantity of iodide also has a marked effect. The quantity of gold can be increased a drop at a time, until that part of the plate treated with it will turn blue under the action of the light in the camera, before the rest of the plate is exposed sufficiently to show but the faintest trace of an image under the developer.

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* *Photographic Times.*

This emulsion can be developed with the carbonate of soda and pyrogallic acid; I do not mean bicarbonate, but what is commercially known as sal-soda. It can be used very strong, with bromide of ammonia as a restrainer. I have used it between eighty and ninety grains to the ounce of water; that was just about saturation. About sixty grains to the ounce gave very satisfactory results.

Some time since the *British Journal* published a formula for strengthening emulsion plates with chloride of copper and alkaline pyro. Afterwards, Mr. M. Carey Lea published in the same journal a similar formula, substituting, however, the chloride of gold for the chloride of copper. I have used the chloride of mercury in this formula with more satisfactory results than with either of the first-named chlorides.

There is still another formula which I think would give more general satisfaction on account of the rich colour it gives to the negative, which is the mixing of the chloride of gold and chloride of mercury in the proportion of one grain of gold to four of mercury. I prefer, however, the iron redeveloper which I published some time since, as it is more under control, and the results are in every way satisfactory.

In a number of the *British Journal* there is an article on the removing of hyposulphite of soda from prints. The process alluded to is one published by me several years since, and appears to have been successfully used by a Mr. Viles. I have since, on several occasions published an improvement on the process as first given.

When the solution of lead is added to the water to receive the prints, it becomes milky by the formation of the carbonate of lead. If the prints are put into the solution in this condition the carbonate adheres to the albumen surface, and is not easily removed.

This carbonate of lead is readily soluble in acetic acid; therefore a sufficient quantity should be added to the water after the lead, and the mixture agitated until it becomes clear; then it is ready for the prints.

VARNISH, AND THE MATERIALS USED IN ITS MANUFACTURE.

BY Z. T. ANSTETT, PH. G.

The word varnish is probably derived from the Latin *vitrinire*, to vitrify, or to give a smooth and polished surface like glass. Varnish was known and used from the earliest historic periods, and the art of applying it was brought to great perfection among the nations of the East, as our term "Japanning" shows. The Egyptians understood it, and the pictures recovered from Pompeii and Herculaneum have kept the bright freshness of their colours in consequence of having been covered with a varnish of which the principal constituent was wax.

A great many varieties of varnish are produced now in order to satisfy the demand for its use in the various special branches of industry, and are in almost all cases made by the solution of various resins in some solvent which will evaporate after the article is applied, thus leaving the resin deposited on the surface as a thin and even coating. The characteristics of a good varnish are that it should remain brilliant after the evaporation of the liquid medium, and present a dry, hard surface, instead of a greasy and tarnished one. It should also adhere closely to the surface to which it is applied, and not be liable to scale off when it becomes dry, even after the expiration of a long time; beside these qualities, it should become as hard as possible, without becoming brittle.

The principal solvents used in the manufacture of varnish are linseed oil, oil of turpentine, and alcohol, and the chief resins used are copal, amber, mastic, sandarac, lac, elemi, dammar, anine, and caoutchouc. Beside these, gamboge, aloes, dragon's-blood, and saffron are used as colouring matter. Copal is obtained from *Rhus copallinum*, a tree indigenous to Mexico, and from *Eloocarpus copalifer*, a tree indigenous to India; it is also found on the coast of Guinea, as a fossil resin in the blue clay near London, and other parts of England. Anime, another variety of copal, is a South American resin, supposed to be the product of *Hymenoa courbaril*. It derives its name from the quantity of insects it generally contains, which having been attracted to it become imbedded in it. This is the hardest and most expensive copal in the market. The principal varieties of copal used in the manufacture of varnish are: Anime Benguela, Angola and Accra from Africa, and Kauri from New Zealand. Amber is a fossil furnished by trees of some former geological period. It is found chiefly in Prussia, on the shores of the Baltic, and from there we obtain the amber used in this country. It is also found on the eastern coast of Courland, in in the coal mines, near Prague, near Catania, in Sicily, and has been found near Cape Sable, in Maryland, in New Jersey, and a mine is now worked near Rockwood, in Australia. To prepare amber varnish the resin is first subjected to roasting, whereby it is rendered soluble in a mixture of linseed oil and oil of turpentine. Mastic is obtained from *Pistacia Centiscus*, a shrub indigenous to the Levant. Our supply is obtained chiefly from the island of Scio, or Chios, in the Grecian Archipelago, where the tree is cultivated. A varnish made by dissolving mastic and caoutchouc in chloroform is highly esteemed by microscopists. Sandarac is the product of *Thuya articulata*, a tree growing in the north of Africa. Sandarac varnish is largely used in the manufacture of decalcomania. Lac is a resinous substance obtained from several trees growing in the East Indies, particularly from *Croton lacciferum*, and also from several species of Ficus. It is supposed to be an exudation from the bark, owing to puncture of an insect belonging to the genus *Coccus*. Of the several varieties known to commerce the most common are stick-lac, seed-lac, and shell-lac; the latter is used in making the shell-lac varnish, by dissolving it in alcohol or naphtha in the proper proportion. A colourless varnish is also prepared from shell-lac. Elemi is a resin furnished by a numerous variety of trees in various parts of the world. That which comes from Holland is supposed to be furnished by the *Canarium Calsamiferum*, of the Dutch possessions in Ceylon. All the elemi of commerce was originally brought from the Levant. At present it is derived from three sources, namely, Brazil, Mexico, and Manilla. A varnish of elemi is said to be used by the hatters. Dammar, or Damar, is a resinous exudation obtained from various trees growing in the East Indian Islands. It is used by the Chinese for coating the bottoms of boats, and is used in this country for making the better quality of damar or white varnish.

Varnishes are classified as ether spirit varnishes, volatile oil varnishes, and fixed oil varnishes. Ether varnishes are very little used. Spirit varnishes are usually made with alcohol, and are produced in great variety. The best spirit varnish is made by simply digesting the resin in the alcohol, allowing it to evaporate in the sun or shade to the proper consistency; but this plan is too slow to satisfy the exigency of our modern industry, though it produces a varnish having the least amount of colour. A more rapid process is heating the varnish over a water bath or the fire, and this changes tha colour very materially, but being the most rapid process it is generally employed. Oil of turpentine is the volatile oil generally used in the manufacture of varnish, and it is chiefly used in copal varnish. Spirit varnishes are injured by being kept too long, while turpentine varnishes, on the contrary, are improved by keeping, a more intimate union taking place between the resin and the oil. Linseed oil and poppy oil are sometimes used with copal or amber to make fixed oil varnishes, and this class, although slower in drying than the others, leave more residue, and are therefore more durable and better adapted for resisting the action of the elements. For interior work they are also considered the best, where colour is no objection, since they can be washed over without injury. Oxide of lead (litharge) is sometimes used to facilitate drying.

Copal being harder to dissolve than most resins, a special process is employed in manipulating it. The resin is first melted over an open fire till perfectly liquid, when linseed oil, heated to about 400° F., is added, and then oil of turpentine, to bring the varnish to the proper consistency. The linseed oil does not combine with the resin, but simply mixes mechanically with it, having the particles separated so as to combine with the oil of turpentine, which should be added slowly so the mixture can take place by degrees. The state of the weather must be taken into consideration when making varnish, since when it is damp they absorb sufficient moisture to greatly impair their brilliancy. The consumption of varnish is now very great, and constantly increasing, which is due to the greater number of purposes to which it is applied, while the increase of wealth naturally develops the taste for articles of luxury. The taste, too, for the use of natural woods in our houses and furniture, and the consequent discarding of the use of paint, have much to do with increasing the consumption of varnish. To give the reader some idea of this business, I will simply give the statement of one manufacturer as furnished to me. This factory consumes annually over 600,000 pounds of copal and shellac, and over 300,000 gallons of alcohol, linseed oil, and oil of turpentine, producing, with other ingredients of less consequence, nearly 400,000 gallons of varnish, ranging in price from 80c. to $6 per gallon.—*Druggists' Advertiser.*

Correspondence.

SOME SUGGESTIONS ON PORTRAITURE.

DEAR SIR,—When you honoured me with the request to write a short paper for your YEAR-BOOK, I stated my inability to do so for reasons satisfactory to myself. I hold that "deeds are better than words," and I now intend giving you a tangible proof of my goodwill towards all men in general, and yourself in particular.

It has been suggested by friends and others—among whom are metropolitan artists of repute—that I ought to publish a series of cabinet portraits, which, to them, seemed worthy of notice, and might prove useful to others. Had I no other object in view than that of parading before you what I can do, and otherwise expect benefit from your goodwill, I would refrain; but I hope you will credit me with better motives, and it will be for you to determine to what extent I justify them.

From publications which are sent to me, I find that our American friends complacently "lay unto their souls the flattering unction" that they do everything photographic very much better than we do, and it is this "idea" which has suggested to me a few remarks which I intend making for the good of all whom it may concern.

There are three points to which I wish to draw attention in the cabinets I have sent you:—1st, that pictures should not be made of backgrounds; 2nd, that retouching should be an aid only; 3rd, that expression is an all-important object in partraiture.

In the first place, don't imagine that I object to a suitable background as a valuable property for the studio—what I wish to point out is that it should be what its name indicates, and appear quite subserviently to the subject. I want the subject first, the surroundings next, and, finally, the background behind. "Distance lends enchantment to the view"—a good motto for photographic backgrounds, which, when in use, should be placed at from one to one and a half yard from the subject, as circumstances require.

Secondly, that retouching should be an aid only, and particularly confided to hands skilled in the art of drawing and even painting, is a fact which forces itself more and more upon the artist photographer's attention every day. But, I would ask, how many retouchers are there who have ever held a pencil or a brush? Very few indeed, I should say, if we are to judge from what we see every day as we go along. Look at all the portraits of celebrities, and note particularly those of a certain "Diva," who is made to appear as being always "sweet seventeen." What a pity it is to behold otherwise excellent productions of our trans-Atlantic friends so completely done to death by the pencil, and to find that all real beauty, character, and even resemblance, have been "licked entirely out of creation!" Away, I say, with these French polishers, photographic planers, smoothers, and levellers of all things to be respected.

I protest against this wholesale "massacre of the innocents," because it is not artistic, and there is too little of truth left in it to be acceptable. Flattery may go a certain length, but it becomes the "food of fools" if carried too far, and, as our witty neighbours say, "*s'il en faut, pas trop n'en faut.*"

My third point, that expression is all-important in a portrait, is so patent to every one, that it might appear superfluous to insist upon it, were it not that we so seldom see that "revelation of the soul," so to speak, depicted on the countenances we study as they appear photographically. To arrive at the best results, many little things should be observed, such as rapid arrangement, avoiding all causes of annoyance or fatigue to the sitter, such as entrenching with furniture, and the aggravation of trying many attitudes to arrive at effect. Simplicity, both for effect and attitude, always produces the best results. It may be objected that, in our climate, it is often very difficult, both to "retain" on the part of the sitter, or on that of the photographer to "catch," a good expression, because the time of exposure is generally too long. That is quite true; but the evil suggests the remedy—study this point.

In conclusion, Mr. Editor, I will now ask you whether the evidence I have laid before you bears out all that I have said? If I have failed to satisfy you that pictures can be made without backgrounds, that faces can retain their character, cheeks be fleshy without coarseness, and honest wrinkles respected without harshness; and, finally, if I have failed in securing happy or appropriate expressions, allow me to say, in the words of the great poet, "Lay on, Macduff!" but I will not "damn" you, neither will I cry, "Enough!"

Should the expectations have been realised, I shall not object to your singing the hymn of praise in the sweetest tones. You know that we are very vain, we "Knights of the Camera." In fact, some of us even go the length of "saying," which is very much worse than "thinking," that they alone can photograph—evidently an "optical delusion." Some might even hint at something else in such cases. On the other side of the pond they call it "high flying." The true definition, I think, is "brag;" but, as this is the time of peace, let us say it is simply a weakness.

And yet I don't altogether dislike these brothers who may have too long inhaled the intoxicating perfume of the collodion bottle—they are generally clever fellows, and should content themselves with being "cocks" among their peers. I have a much greater dislike to those "theorists" who flood photographic literature with their visions of what would be very delightful if we could only discover one grain of sound practice as a basis for their lucubrations. I am of the same way of thinking, on that subject, as a great man who has truly said that a little common sense is worth all the learning in the world. As a last word, I would say to our theoretical friends that, so long as they have not fully tested their theories by abundant practice and satisfactory results, they ought not to allow themselves to be troubled with the "*cacoetis scribendi*" of which they may have read, and should desist.—Believe me, dear Mr. Editor, your humble, devoted, obedient servant,

Liverpool, December 1877. C. Ferranti.

[The series of cabinet portraits by which Mr. Ferranti's paper is accompanied is good throughout, and contains some examples which are simply perfect, both as pictures and photographs. Delicate, round, and well modelled, with very little trace of retouching, admirably posed and lighted, pleasant in expression, without obtrusive accessories, they are in every way admirable examples of photographic portraiture; whilst the carbon, or "chromotype," printing is a marvel of excellence. Some of the oldest and most experienced photographic amateurs to whom we showed them pronounced them the finest examples of printing they had seen. Partly due to the excellence of the negatives, and partly to skilful printing and fine colour in the tissue, there is a singular pulpy lusciousness in the texture which shows it to be living, yielding flesh, and not stone. With considerable hesitation, we make the admission that some of these prints are better than any prints we have seen in silver.—Ed.]

THE DARK-ROOM WINDOW.

Sir,—Among the multitude of things discussed in your useful journal, none has been so unsatisfactorily settled as the non-actinic lighting of the operating-room. What the operator wants is a window large enough, not only to see how the development of the plate progresses, but also to see everything about him. Light is as much needed there as in the glass-room, only different in kind, and I see no reason why an operator should strain his eyes over a plate in front of a dimly lighted window a foot square, when he might have a window a yard square, at least, sufficiently non-actinic to develop the most sensitive Kennett plate without fear of fogging. I have used such a window for the last ten years, and may therefore be said to have proved its usefulness. No coloured or flashed glass is needed, ordinary sheet glass being sufficient. Get the following tubes of oil colours from an artists' colourman:—

Burnt sienna, raw sienna, megilp. Mix the three together in equal proportions with a palette knife, and with a soft hog's hair brush paint both sides of the window. When dry, a second coat may be given on the inside, if needed. Chrome yellow is useless, for not only is it too granular and opaque, but it has a tendency to bleach. A window three or four feet square can be painted for 2s., the tubes costing 4d. each. For dark tents a single piece of yellow cloth painted on one or both sides makes a capital window; I use nothing else.—Yours faithfully,

Cedric.

Talk in the Studio.

Photographic Society of Great Britain.—At the next meeting of this Society, on Tuesday, January 8th, Mr. Edward Viles will read a paper on "Micro-Photography."

To Correspondents.

Moy.—Many articles have appeared in the News and in the Year-Books on printing on silk and other textile fabrics. You will find a practical article on the subject, by a gentleman of our staff, on p. 147, vol. xi., of the Photographic News.

J. F. Newland.—So long as your nitrate bath is in good order, keep it in the dark. When it gets out of order add a little carbonate of soda, and place the bath in the sun: this is better done in an open dish than in a bottle. 2. We have not used one of the fires you mention, and we cannot say how far they are suitable for a studio, or whose are the best.

Boxer.—You have no right to copy the engraving without permission, and you will very properly incur great risk if you do so. The period of protection is twenty-eight years.

H. Harland.—Advertisements should be forwarded to the publisher; and if the subject be, like the Photographers' Benevolent Society, one to which the Editor can call attention in the literary columns, the matter should be brought under his attention in good time, as it is too late when the paper is just going to press.

One in a Fix.—The defects in the negatives sent appear to us to be due to a partial solution of the film by the varnish. Some samples of collodion, generally old samples, are soluble in strong spirit, and when varnished, the film is attacked, and assumes a rotten, granular appearance, with semi-transparent patches, and a slight running appearance of portions of the image; and this is just the appearance of your negatives. If, however, as your description suggests, this appearance is seen on first producing the negatives, it must be due to other causes, difficult to indicate. Try another sample of collodion, and, failing a remedy in this, try a new bath.

B. M. F.—The best aid to a perfect surface of collodion leaving the glass without injury consists in using a perfectly cleaned glass which is quite dry when coated. If wax be used, which is not always necessary, it must be an imperceptible film. A thick coating often leaves a semi-opaque film on the enamelled surface, which looks like a greyish bloom or fog. That is probably the defect of which you complain.

T. G.—The chief defect in your vignetting is due to the use of a dark background. For pictures which are to be vignetted a light background should be used; otherwise it is difficult to obtain a pleasing gradation from the tint of the background to the white of the margin. Where it is necessary to vignette a print from a negative with dark background, it is better to tint the margin, and so make what is known as a grey vignette, the dark background graduating into a grey margin much more harmoniously than into a white one. Also place your vignetting mask at a little distance from the glass, by which you will easily secure softer gradation.

Try All.—As a general rule, we think it is wiser and safer to purchase a good commercial collodion. But for an experimentalist the manufacture of collodion is interesting If you can purchase good pyroxyline, it will save you much trouble; if not, you must try to make some. The task is not difficult. The mode has been described in our pages, and in several of our Year-Books. We prefer the mixed acids, using equal parts of commercial oil of vitriol, which usually has a specific gravity of 1840, and of nitric acid sp. gr. 1420. Immerse the cotton at a temperature of 140° Fahr., and stir well with a glass spatula for about ten minutes. Then wash very thoroughly. The cotton will gain in weight about fifty per cent. This should dissolve easily at the rate of five grains per ounce of mixed solvents. Equal portions of washed ether and alcohol of 820 sp. gr. answer well. We prefer to dissolve the iodide and bromide in the alcohol, then add the soluble cotton, and finally the ether. About three and a-half or four grains of iodide of ammonium and one grain of bromide of cadmium give good results. The collodion should stand a week or a fortnight after mixing; then decant.

Ceramic.—There are two distinct methods of working in producing photo-enamels, both of which have been described in our pages. One consists in preparing a surface of some adhesive substance, like a mixture of albumen and honey, made sensitive to light by means of bichromate of potash or ammonia. This is exposed under a transparency, and the light hardens all the lights of the picture, leaving the darks more or less sticky. A vitreous powder is applied with a camel's hair brush, and adheres to the sticky portions, forming the dark portions of the image, in gradation proportioned to the action of light. The plate is then treated with a mixture of dilute nitric acid and alcohol, washed, and then fired in a muffle furnace. This is known as the powder process. In the other, known as the conversion process, a good collodion transparency is produced: This is then treated with solutions of chloride of gold, platinum, or iridium, or a mixture of the three, by which the silver image is converted into an image of those metals, the silver being converted into chloride of silver, which is dissolved by a fixing agent—ammonia by preference. The image, being well washed and dried, is, after burning off the collodion, fired in the furnace. For detailed instructions see articles in former volumes and Year-Books. The beginner must make up his mind to acquire skill through many failures, as practical experience is the chief element in securing success. There is no patent to bar the working of either of these processes. They have both been patented; but the patents are expired. Some articles on the subject by a successful practical man will shortly appear in our pages.

The Year-Book of Photography for 1878.—We have pleasure in thanking many of our friends for contributions in response to our appeals. Some articles have, unfortunately, arrived too late for insertion, but will appear in the pages of the Photographic News.

Several Correspondents in our next.

The Photographic News, January 11, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

The Last of the Elemental Gases—Photo-Engraving and Our Everyday Illustrations.

The Last of the Elemental Gases.—We stated last week that there were "but two elemental gases now known in chemistry." We were too precipitate, it seems, for within ten days of the downfall of oxygen as a gas, the other sisters, nitrogen and hydrogen, have succumbed also. M. Caillstet, we are told, effected the liquefaction of hydrogen and nitrogen in Paris on the last day of the old year, and thus completed a research which has long baffled chemists and physicists. M. Cailletet solved the problem in the presence of three members of the Institute of France, and although it is not yet generally known how the feat was accomplished, we may well suppose that the means employed was not very unlike that used by M. Picket to liquefy oxygen. Subjecting the gases to a low temperature at considerable pressure no doubt made them yield, as the experiment did their predecessor, and we do not know now of any permanent gaseous body. Oxygen, hydrogen, and nitrogen must henceforth be expunged from chemical manuals as being elemental gases, and, indeed, this heading must now disappear altogether. Many, doubtless, will ask of what good are these discoveries; but, as Faraday was wont to point out, if they always applied the *cui bono* argument, investigation would find little satisfaction in proceeding with their work. That there was plenty of evidence previously to make us believe in the gaseous, liquid, and solid consistence of every body was, no doubt, true; but what was before speculation only, has now become a certainty. Taken as a purely chemical investigation, we can, indeed, hardly over-rate the value of these grand discoveries, and photographers, as well as every other worker and employer of applied science, must perforce take a keen interest in them. Whether it will be possible to go a step farther, and, as in the case of carbonic acid, not only liquefy, but actually solidify oxygen, hydrogen, and nitrogen, remains still to be proved; but, in the meantime, we can well rest contented with matters as they are. To see liquid oxygen dropping from a tube is a sight which few chemists were sanguine enough to think possible, and yet, hereafter, our children will read in their chemical handbooks that, prior to the year 1877, the existence of this element otherwise than in a gaseous condition was unknown. What ignorant people we were to suppose that oxygen, hydrogen, and nitrogen were elemental gases, will form the subject of many a comment hereafter.

Photo-engravings and our Everyday Illustrations.— We seem scarcely further advanced than we were a dozen years ago in the matter of photographic book illustration, when we presented the readers of this journal, by way of frontispiece, with a little Irish sketch of Mr. H. P. Robinson, printed in Woodburytype. Since then many books and journals have appeared with photographic illustrations, but the latter are none of them more perfect than the early example we were privileged to place before our readers. The *Figaro Programme*, *Men of Mark*, and similar publications have put before the public a large number of portraits of one kind and another, and a book published two years ago by Messrs. Warne and Co., called *Treasure Spots*, as also Captain Abney's *Temples of Thebes* (Sampson Low) have shown us what can be done in the way of depicting places and things by mechanical photographic printing. But some of these more recent works are, we repeat, in advance of that which was done a dozen years ago, when Woodburytype, one of the most successful of mechanical methods, first came before the public. We cannot now, any more than we could then, produce photographic printing blocks capable of being printed side by side with litho press; or, at any rate, if such blocks can be produced theoretically, there is as yet no instance of their being employed in everyday practice. We know that much has been done towards securing good phototypes, and we know, too, that examples of the process are printed and published day after day. But they are examples, and nothing more. You could no more take a portrait negative to a printing establishment and request the production of a suitable printing block for press work today, than you could have done when Talbot and Daguerre were investigators, and nothing more. In the *Moniteur de la Photographie* there have appeared one or two examples of press printing of more than ordinary promise, but how far these were produced by photography and chemical agency there was no means of judging. Journals and newspapers which have been started for the avowed purposes of giving us photographic illustrations side by side or in lieu of woodcuts are still where they were on the first day of publication, so far as the printing of camera pictures in greasy ink are concerned, or they content themselves with presenting their readers with Woodburytypes, or with reproduction of black and white lines. The *New York Daily Graphic* was to have done wonders in photography; indeed, photography is its *raison d' etre*, and the picture of a camera is upon the heading of the newspaper. And the journal certainly does permit the photographer to assist a good deal, although not in the way of contributing phototypes. The *New York Daily Graphic* reproduces fac-simile of document and letters from notable persons. In the case of law reports, in which a letter is more than usually interesting, the *Daily Graphic* reproduces it in facsimile, and places before its readers an equivalent to the original document. A breach of promise case usually supplies this newspaper with plenty of illustrations, and people doubtless take far more pleasure in reading love letters, with all their peculiarities of handwriting and style, with the dashes and flourishes that signify so much by the love-laden pen, than can be obtained by the perusal of words in mere type. In the case of the Beecher-Tilton scandal, the letters that passed between the parties of the suit filled many pages of the broad newspaper, and were eagerly scanned by everyone interested in the strange proceedings. We fear, too, that sometimes documents are reproduced in this way which should not appear at all in the public press. An instance of this occurred not long ago. Mr. William Crookes, F.R.S., wrote a letter to a gentleman in Boston anent the *seances* of Mrs. Eva Fay, a letter which, if not a private document, was certainly never meant to be printed in extenso. Suddenly the *New York Daily Graphic* appeared with a photographic facsimile of the letter in question. The recipient of it at once searched among his papers for the original document, and then found it safe and sound, so that it was little use accusing anyone of having stolen it. Mr. Crookes, of course, called his correspondent to account for breach of privilege, but the latter could do nothing but apply to the editor of the *Daily Graphic* for an explanation, which, it seems, was not forthcoming. Any process is, however, open to abuse, and this was but an example. Beyond the production of writings, and black and white sketches, this newspaper, as others of the same nature, has nothing of a photographic nature. Artists' pencil sketches, as we have already pointed out in these columns, cannot be satisfactorily rendered by photography so as to dispense with the graver. It is possible to produce a sketch that is capable of reproduction by photography alone; but in this case the lines must all be made with jet-black pigment, and there must be no grey ones among them. Directly a wood-cut is printed upon paper, any photographer can reproduce it and make a block for printing in the printing press. But you cannot make a block from the artist's sketch on wood or paper, unless it is, as we said, specially drawn to humour photography. The artist, with his pencil, makes grey lines as well as black ones; he uses sometimes the sharp point of his pencil and sometimes the broad edge thereof, and it is in the latter case that photography experiences a difficulty in following him. The graver knows how to treat these broad, grey lines; he splits them and leaves more white, the lighter the lines are to appear. This, obviously, the camera, which is but a slavish copyist, cannot do.

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M. DAVANNE ON BROMIDE OF SILVER EMULSION PLATES.*

In a tour of some weeks' duration, made in September last, I took with me about thirty plates prepared with the bromide of silver emulsion, according to M. Chardon's formula, and I can again affirm the considerable advantages of the method, both for certainty of success and simplicity of manipulation. But though this mode of preparation appears to me likely in time to replace almost all other dry collodion processes, I think that it is necessary to determine, by continued investigation, the question as to bringing it into practice.

Having encountered in fixing the negatives several irregularities that astonished me, I began to search for the cause, and after a great number of experiments, many of which led me completely astray, I believe myself in a position to explain them in a satisfactory manner.

I have remarked that, generally, glasses developed and then dried fix less readily than if flooded with the hyposulphite of soda directly after developing; also, I fix my first plates before letting them dry, and they do not present any fault or irregularity; the others, having been developed and then dried for future fixing, act in quite a different manner. After having soaked these negatives in water, I poured on the hyposulphite of soda at 20 to 100, until the white coating of the bromide of silver had disappeared, and after well washing I dried them. To my great surprise after drying, I found they presented the dull, white appearance characteristic of imperfect fixing, which by a prolonged second fixing did not disappear.

I then thought, and not without apparent reason, that the coating of collodion had become impenetrable in the drying, and did not permit the fixing solution to penetrate sufficiently, and that a thin layer of the bromide of silver had escaped its action. I employed more energetic fixers; the result was identical, and I persisted in my idea, though unable to understand why this opaline or milky-pearly appearance disappeared when the film was moist, and reappeared on the glass drying. Its extreme thinness might, perhaps, account for that.

Believing, therefore, that it was necessary to render the collodion film slightly more penetrable in order to obtain a complete fixing, I moistened the plate with spirits of wine of 36° in the same way as when commencing the development, and the result was, after fixing and washing, all traces of the opaline had disappeared. Satisfied with this experiment, which appeared to me very conclusive, I commenced to make a number of trials, and discovered that this opaline layer does not preserve any sensitiveness to the light; that in after-developments, when the negative is required to be forced or intensified, it has no action; also, that it gives the negative a slightly less determined tone, that its thinness permits it to be dissipated by the penetrating action of all alcoholic varnishes, &c. The last experiment showed me still an error, namely, that the opaline appearance of the film was neither owing to incomplete fixing nor to the failure of sufficient penetration, but to a much simpler cause, viz., the pulverulent texture of the collodion film, which gave the plates the appearance of ground glass.

I tried, but in vain, to effect a perfect fixing, for the sake of experiment, on a glass that presented a more than usually coarse surface; in spite of the repeated washings with alcohol, and prolonged fixings, the opaline or rather grain-like appearance remained, and the great analogy of appearance between this plate and those which resulted from my former experiments obliges me to admit an identical reason for the same, that is to say, a defect in the collodion film, which gave the plate the appearance of ground glass. If this defect is very slight, it disappears at the first contact of the alcohol, which swells, and without doubt softens, the substance of the collodion, permitting particles to adhere one to another, and thus reviving the transparency; thus, it is sufficient with one coating of pure alcohol or ether to remove from a defective negative all traces of opaline after the evaporation of the liquids; but if the grain or texture be too coarse, the opaline reappears whilst the particles cannot re-unite; in this case operations must be suspended, and the opaline will only disappear under the action of varnish.

As results of my experience, I think I may remark that the opaline that remains after fixing and drying certain negatives is due to the pulverulent structure of the collodion film, and not to a residue of bromide of silver. Consequently, this opaline layer has no sensitiveness either to light or to the re-developers used for forcing up the negative. This opaline disappears completely under the action of varnish or fluids that penetrate the structure of the collodion film. It suffices, for the complete prevention of an appearance of this opaline, to flood the glass first with alcohol, and then to proceed with operations without letting the collodion film dry.

It is, however, a matter of indifference whether the plates are fixed directly after development, or later on after having dried, but at all times in the last case, to obtain a rapid and perfect fixing, it will be advisable to moisten the film with water, or, better still, alcohol at 36°. If the negative is to remain on the glass, the varnishing will guarantee sufficient transparency; and if to be detached and placed on gelatine, the gelatine film will have the same action as the varnish. I ought here to mention the following observation: with many plates I experimented on, of the preparation of which I was ignorant, the collodion film dissolved with alcohol at 40°, but never at 36°; it is advisable, therefore, to make a preliminary trial on the corner of your plates, to see whether the varnish you are about to employ has not too violent an action; if so, this can be remedied by a thin coating of either albumen, gum arabic, or gelatine, in the proportion of 10 to 100, on which the varnish can be used with all security, or by employing non-alcoholic varnishes, as, for instance, a varnish of amber dissolved in benzole.

A propos of the fixing of bromide of silver negatives, I must remark, that M. Chardon and M. Bardy have tried other fixers besides hyposulphite of soda—to wit, both cyanide of potassium in solution, and the alkaline sulphocyanides in concentrated solution—and the results of these are excellent. M. Chardon found it particularly advantageous in the field to employ sulphocyanide of potassium or ammonia at 20 to 100. The effect is, so to speak, instantaneous. A few washings, only half what is necessary for soda, are sufficient to free the plate of your fixing material, and should any traces remain, its deliquescence prevents it from crystallising on the negative: it often happens with hypo-soda fixing that it reappears like rime, and the negative is spoilt. These different qualifications strongly recommend the employment of sulphocyanides for fixing, especially on long excursions.

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PHOTOGRAPHING ARCHITECTURAL EXTERIORS.*

It has often been said that subjects of this nature, on account of their rigidity and immovability, are the most easy to handle by means of photography; they generally present such an area of surface, and enable one to select a time when the reflecting surfaces are the most favourable, that any one who can photograph at all, it is said, should be able to make good pictures of such subjects. Moreover, on account of the reasons stated, one is enabled to make larger sizes and use smaller diaphragms, without any regard to the time of exposure, than is possible with any other style of subjects. Still, the matter is not so easy as some suppose; especially was this so with such large buildings as were presented to the cameras of the operators of the Centennial Photographic Company. These vast structures were exceedingly difficult to handle; it was an object to make pictures as well as photographs, and the mechanical difficulties which stood in the way sometimes caused considerable trouble; size alone was not merely sufficient, neither was architectural exactness enough to satisfy. Such subjects when undertaken too large often present disagreeable lines and angles, and while at first we admire the dimensions attained, we are disappointed by the mechanical appearance of the photograph. Larger sizes than twenty by twenty-four plates were not, therefore, attempted by the Centennial Photographic Company, and the smaller the size the more satisfactory as a usual thing was the picture.

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* Read before the French Photographic Society.

* *Philadelphia Photographer.*

In the matter of lenses for such subjects it was necessary that selections should be made of such as should be absolutely free from distortion, therefore no single lenses were used; almost entire use was made of Morrison's landscape lenses, to the excellent qualities of which we have already added our testimony. The smallest diaphragm possible was always employed, and thus the best representation of an object was secured. Of course, every attention was given to the light upon the subject, and the time of day chosen when it was best. The choice in this direction was a mere matter of thought, inasmuch as one being once acquainted with the direction of the light at certain times of the day, can very easily decide when to make his view. Of course, it is very necessary, when attempting such subjects, the camera should be level, the light well chosen, and the smallest diaphragm the nature of the light permits used. Figures in such subjects are always to be avoided, if possible; they are a nuisance to the architectural photographer.

As to the manipulations, silver bath of forty-five grains was usually used with the following

Collodion.

Iodide of ammonium	3 grains
Iodide of potassium	3 ,,
Bromide of cadmium	3 ,,
Cotton	5 ,,
Ether and alcohol	equal parts.

Developer.

Glacial acetic acid	1 ounce
Water	16 ounces

Photosulphite of iron 15 to 30 grains to an ounce of solution.

Of course, they are varied according to circumstances, and no exact rule can be given. In warm weather a more diluted developer was used than during the colder days, and the time of exposures must also rule the developer.

INTERIORS.

This embraced the most difficult subjects which came in as a part of the work of the Centennial Photographic Company. We do not, of course, expect to go into details respecting the various kinds of subjects which were photographed, as our readers will probably never be asked to make such subjects, and, therefore, our remarks will more directly allude to interiors of buildings proper.

Of course a great essential to success in such subjects is the quality of the illumination which they present. Here again came the difficulty of distortion in the foregrounds or nearer parts of the picture, unless great care was taken in adjustment. Here came in the excellent qualities of the double swing-back camera boxes of the American Optical Company.

Of course we all know these subjects need not necessarily be lighted from the top. The very best lighted building, which M. Gihon has already mentioned, was Agricultural Hall. Those who have seen it will remember that its apartments were made of a series of Howe trusses, and that the interior was calsomined with a greyish colour, while the light was received from windows very appropriately placed in the sides of the roof. Here the most beautiful effects of light and shade were secured. Next to this in quality was perhaps Horticultural Hall, which, although in the shape of a parallelogram, was beautifully lighted from above and at the sides.

Machinery Hall was, although beautiful, full of horrid angles and straight lines. Next to be preferred in the matter of lighting, but the worst and meanest building with one exception, was the Main Building, the largest of all the structures, on account of its peculiar construction, not only giving exceedingly bad lines, but so strangely and miserably lighted, to say nothing of the round windows filled with rudely coloured transparencies, which line the upper series of lights. The exception we have named was the Art Hall proper, and its annex.

Nothing could be conceived more illy adapted to the purposes of photography than these buildings. However, the difficulties when known are more easily met. One great advantage that they all had was sufficient space and a considerable choice of position. Here also came in use the Morrison lenses, and they proved themselves to be all that could be desired.

In the matter of exposure there could be no rule; the general views were made in from twenty to thirty minutes, but for some subjects frequently from sixty to one hundred minutes' exposure was required. These long exposures, however, were required because of the crowded nature of the buildings, and the almost entire absence of appropriate light in some cases.

We were informed at the beginning of our work that it would be impossible to take such subjects without employing the dry process, as the exposures would be longer than it would be possible to keep any wet plate, especially in hot weather. We are free to say, however, that we did not find this the case; difficulties we had, of course, but they were met, and it was rare a subject was absolutely given up because of the impossibility to take it, and the wet process was used throughout.

It may seem incredible, but the examples were not few where the plates were kept over two hours between the time of coating with collodion and the development.

The method employed in such cases was as follows:—Collodion the same as named before for exterior work with the following modifications. A good ripe collodion was used, and new strictly avoided; to this, drop by drop, distilled water was added, equivalent to about two drops to each ounce of collodion; after the addition of each two or three drops, the collodion was well shaken, lest the precipitation of the cotton should occur; after this the collodion was carefully filtered. We know that this formula is not new, but we believe there is much in the manner of adding the water by small degrees, and carefully shaking after each addition. We recommend those who make this class of work to try it.

STATUARY.

Mr. Gihon has so thoroughly gone out the matter of making pictures of statuary, that we need say but little on this subject. We are told also that such objects are amongst those least difficult to the photographer, but that is only the case when the object is under the control of the operator, and he can place it in whatever light he has at his convenience. With our work this was not so; it was not permitted that the objects should be moved, and therefore it was sometimes difficult to light them properly. The most neat and careful manipulation is required in such cases, as the background must be absolutely clear from spots and streaks that they may print entirely black.

The duration of the exposure is also of considerable importance, and great care should be given to the selection of an appropriate background. The kind used by the Company was green baize; in some cases, as may be seen, no background was used but that which was offered by the pictures hanging back of the piece of statuary. The same sort of lenses were used as for our other work, the variation being made in the focus according to circumstances. One thing very important was to avoid too violent a flow of light upon the subject, lest the modelling of the form be entirely destroyed instead of it being attained fully. Were the contrary course pursued, the appearance of the photographs would be harsh and coarse and hard.

We were often asked why we did not reproduce the statuary in larger sizes? It should be remembered that originals of this kind are more or less excellent according to the perfection of their forms, and any distortion would cause dissatisfaction, therefore it was rare that a picture of statuary larger than eight by ten size was made. A great choice in the outlines of the whole is always possible with a piece of statuary, and here comes in the photographer's knowledge of art principles—first, being familiar with the name of the subject, and thus obtaining the ideas of the sculptor, he must select such a view as will most fully represent the said ideas, lest the representation be that of a mere piece of masonry. As to the formula used for making such work as this, but little change was made in what has already been stated as used for exteriors, except that new collodion was usually used instead of collodion that was more ripe, softness and delicacy of light and shade being better secured in this way than when a more intense collodion was used. This, too, was modified a little according to the position of the piece in hand.

Still-Life Subjects.

Under this head came many of the most beautiful things of the Exhibition, such as bronzes, draping, carvings, bric-a-brac, glassware, jewelry, &c., objects which are splendidly adapted to camera work, besides enabling one to become familiar with the various qualities possessed by the classes named, and the treatment necessary to secure the proper result. Here were bright surfaces, and coloured surfaces, and texture, and fabrics, and smoothness, and light and dark objects, with all sorts of arranged lines and gradations of light and shade, all giving great room for skill in treating them.

Here the lenses used and the formula needed should also be changed according to the subject, and any of the modifications named above would come good.

One great secret in treating a variety of objects is to find the best way of lighting them before proceeding with the work. It is not a good rule to simply go along without any general rule or principle: on the contrary, it is best first to make up your mind, when you are about to photograph an object, that you will secure the best result that photography can secure; that you will, therefore, study first the light and the nature of the subject as to colour, and size, and material, and then choose the best light possible to use, and modify your formula to suit the other circumstances according to the accepted rules in photography, about which there is nothing new.

As we have stated before, the paper we used mainly was the Dresden brand, both double and singly albumenized. Our prints were silvered upon a forty-five grain bath, dried in a large box, the bottom of which was wrought iron, and the heat obtained by the gas applied under the iron, fuming in the usual way, and then printing.

As we have said, Mr. Gihon has treated fully upon the preparation of the prints, and we only wish to add a hint as to the method of drying. All sorts of plans have been tried, but we found the most effectual by laying the prints between ordinary sheeting, one layer upon another; in this way the prints dry thoroughly, and they are just limp enough to make easy cutting with the Bergner cutter. If care be taken to wash these sheets frequently and thoroughly, no fear need be had of any danger to the prints. We much prefer this plan to the use of blotting-pads, which are sooner or later sure to play you a trick by spoiling a lot of prints.

ON A PROCESS FOR THE ELECTRICAL DEPOSITION OF METALS, AND FOR CONSTRUCTING METAL-COVERED GLASS SPECULA.

BY PROF. ARTHUR W. WRIGHT, YALE COLLEGE.[*]

This circumstance suggested at once a valuable application of the process in the production of specula for optical purposes, and the subsequent investigations were directed to this end. The mirrors first made had been formed upon disks of thin glass, such as are commonly used as covers for microscopical objects, those being selected which were most free from defects, and had the best surfaces. By means of a very delicate assay balance, the weight of the glass disks, both before and after receiving the deposit, could be obtained to the one-hundredth part of a milligrm., and hence it was easy to calculate the thickness of the metallic layer in any instance. By this means the relative transparency of the different metals can be determined, and the relation between the amount of light transmitted and the thickness of metal traversed by it. The more particular consideration of these and some other matters of interest as bearing upon the optical characteristics of the metals is deferred to another time, and it is only necessary to mention here the results of some measurements which were made in order to determine the limiting thickness of a film in regard to the transmission of light—that is, the thickness of a film which would allow only an inconsiderable proportion of the incident rays to pass through. As the metallic lustre is developed gradually with the increasing amount of metal, showing conclusively that light actually penetrates these substances to a certain depth, it was important to ascertain whether the thickness of the layer, sufficient for a virtually complete reflection of light, would be great enough to affect perceptibly the figure of a mirror of glass upon which it was laid down.

Experiments for this purpose were made with gold and platinum, and the process of deposition was continued until the films appeared to have just reached the condition of complete opacity. On removing them from the receiverl however, it was found in both cases that a very smal amount of light was still transmitted, as, on holding them close to the eye, a brilliant object, like the sun or a bright flame, could be seen through them. The thickness of the gold layer was found to be 0·000183 m.m., that of the platinum 0·000174 m.m., or approximately one-fourth the length of a wave of light at the red end of the spectrum. The gold, although thicker than the platinum, transmits perceptibly more light, showing that it is the more transparent of the two metals. As the films employed for mirrors may be much thinner than the amount mentioned without an appreciable diminution of the intensity of reflected light, it is evident that the figure of a perfectly wrought-glass mirror will not be changed, when the metal is uniformly deposited, to such an extent as to affect its performance unfavourably. A platinum film of one-fifth the thickness of the one described forms a brilliant mirror, transmitting but a very small percentage of light. The perfect control of the process obtained by the use of the movable electrode will even make it possible to apply the method of local correction for the improvement of a defective figure, or to parabolise a spherical mirror by depositing the metal in a layer increasing in thickness toward the centre, though, of course, it would be better to avoid a somewhat tedious operation by securing the perfect form of the glass beforehand.

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[*] Continued from page 5.

Of the metals that are suitable for the formation of specula, platinum appears to be the most valuable. For while, when well polished, it is but little inferior to silver in reflecting power and freedom from colour, it does not become tarnished by oxidation or the action of sulphurous gases, and when dulled by atmospheric deposits the surface can be cleaned by washing with water or with acids, which is an important advantage. By the method here described it can be deposited upon glass surfaces very easily, and a mirror of the most perfect surface produced at once, without the necessity of a single touch, to complete it. Several such mirrors have been made in the course of these experiments, by the use of concave glass lenses, with the most satisfactory results. The metal film adheres strongly to the glass, and when of sufficient thickness appears to be very firm and hard. In mirrors silvered by the ordinary method, trouble is often experienced from the insinuation of moisture between the glass and the metal, resulting, finally, in the separation of the latter. In those prepared by the new process the adherence of the film is so close as to render such an effect impossible. As a test of this, a small silvered speculum was placed in a beaker of water, where it remained for two weeks, and, besides this, was wetted and dried repeatedly, without showing the slightest tendency to suffer the penetration of the moisture. Similar results were also obtained with platinum and gold films.

With silver the process likewise succeeds well, but it is more difficult to obtain good surfaces than with gold or platinum. The metal is volatilised with extreme ease by the action of the current, and the energy of the discharges must not be too great. Of several trials made with this metal the most successful was one in which not only the degree of exhaustion of the receiver was less than had been employed in other cases, being only to 3 m.m., but the electrode was more distant from the plate, and the battery weaker. The action proceeded slowly in this instance, but with the result of producing an excellent film. With a stronger current the deposit is rapidly made, and has a fine lustre, but the surface has a yellowish colour. This is perhaps partially due to a slight degree of oxidation, but also appears to be owing, in part, to the deposition of a portion of the metal in the form of fine powder, the vapour of the silver, as it streams from the electrode towards the more distant portions of the plate becoming partially condensed, and falling on it in minute particles. That such a result would follow from this cause was shown by some of the experiments in which a rather strong battery was employed. The whole interior surface of the globe was in a short time covered with the powdered metal, appearing an intense purple where thinnest, and shading gradually to deep blue where thickest, the colour being the same by both transmitted and reflected light. The metallic lustre was wanting, though it was readily developed when a portion of the powdery coating, which was easily removed, was rubbed against the surface of the glass with some pressure. The defect was, to a considerable extent, remedied by surrounding the electrode with a small glass tube projecting some 3 m.m. beyond it, so as to clear the surface of the plate by an interval of only 1 or 2 m.m. This had the effect to cut off the lateral portion of the discharge, and to confine its action to a limited area immediately below the extremity of the wire.

The yellow tarnish is removed with the greatest ease by gently rubbing the surface with soft chamois leather and a little rouge, and the metal is so hard that when this operation is performed with care the polish is not at all, or but very slightly, affected. Even then, however, the metal is not perfectly white, having still a very faint yellow tinge. It is well known that silver is not a perfectly white metal, for light which has undergone repeated reflections from polished surfaces of this metal appears yellow, or reddish yellow, though this colour is not perceptible when the light has undergone but a single reflection. But the real cause of the yellowish tint may possibly be found in the very tenuity of the films, which when prepared in this way have a beautiful and intense blue colour by transmitted light. When not too thick, the amount of blue rays which they suffer to pass may be sufficient to cause, by their abstraction, a perceptible tinge of yellow, the complementary colour, in the reflected rays. If this were really the case the colouration should grow weaker with an increase of thickness, and disappear when opacity is reached. Some of the results obtained seem to favour this view.

(To be continued.)

TO COLLODIONIZE A SHEET OF GELATINE ON BOTH SIDES: FOR USE IN CHROMOTYPE PRINTING.

BY C. A. MEINERTH.*

Mr. Lambert says, "hold the gelatine on a glass;" and how many of us "new converts" have tried it and failed. How the gelatine will cockle, and the moment the collodion gets near the edge, how quickly and annoyingly it makes the acquaintance of the other side of the gelatine, thereby ruining it. So we must go to work a little differently, and I hereby give my method to all "carbonites" who have met with the above failures.

1st. Wax and collodionize (plain collodion) a clean 4-4 glass. When "set," immerse in clean cold water, to displace ether and alcohol.

2nd. Put the sheet gelatine in pieces of 5½×7½ inches, and place in cold water to soften. (Better do one at a time, as it softens quickly). When soft, remove the prepared glass from the water, and lay the gelatine carefully on to it, beginning at the lower edge, and avoiding air-bells or blisters. Drain off superfluous water, wipe the back of the glass with sponge, and set away to dry. After a few minutes, examine the gelatine, and if any water has collected in drops, blot off carefully with a pointed piece of blotting paper. Should the gelatine, during drying, show any signs of leaving the glass, scrape away some of the collodion from the glass around (and outside) the gelatine, and stick the gelatine down with sticking paper. When thoroughly dry, flow over with collodion; and when dry a second time, cut around the edge, and remove from the glass, and the result will fully repay the trouble.

PREVENTING AIR-BUBBLES IN ALBUMENIZED PAPER.*

A first-class firm manufacturing albumen paper asserts that the water used for the different baths is the essential cause of the appearance of bubbles in the albumen paper, and that they have invented a method to prevent the appearance of air-bubbles in the paper entirely. When this is the fact, there would have been done a great step to remove all calamities in this respect, and we could not thank enough the firm for publishing the following—

Unfailing Method Against the Appearance of Bubbles.

"After the pictures are taken out of the toning bath, they are several times to be washed with clean water, and to be placed, if possible, singly in a water bath, to which is added three to five grammes of pure muriatic acid to every litre of water. In this bath, keeping it constantly in motion, we let the pictures float for two or three minutes. Then again we wash them out in clean water for two to four minutes in order to remove the muriatic acid partially. In warm weather this requires a longer time than in cool weather. After this we put the pictures in the hypo. bath.

Should the finished copies show a slightly yellow tone, which very seldom occurs, we have to draw them, after the muriatic acid bath, through a solution of five grammes of ammonia in one litre of water for about one to three seconds, washing out once, and going on with the fixation. In this manner any change of tone is impossible."

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* *Anthony's Photographic Bulletin.* †*Philadelphia Photographer.*

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REGISTRATION OF COPYRIGHT.

Cases are continually arising which render it apparent that very imperfect information prevails as to the conditions to be complied with in the registration of copyright under the 25th and 26th Victoria, cap. 68, known as the Fine Art Copyright Act. During the years which our publishers have undertaken to see to the registration of photographs for our readers, they have repeatedly had occasion to call our attention to the looseness, inaccuracy, and insufficiency of the entries made in the printed forms received for entry in the Registrar's books at Stationers' Hall. The details required for entry are simple and brief; but they must be precise and in accordance with the provisions of the Act; inasmuch as penal consequences being involved, the Act will be interpreted very strictly, and very slight informality lead to non-conviction of an infringer. The memorandum for entry in the books of the Registrar should contain the name and a short description of the picture, and if the owner of the copyright desire a small photograph or outline of the picture, the name and place of abode of the author of the picture. If there have been any assignment or sale of the copyright, which assignment must have been in writing, then the memorandum of registration must contain the names and places of abode of the parties to such assignment and the date of it. And until this registration is properly effected no action is sustainable for piracy.

The errors committed in registration are various. We append an illustration of one kind in a case heard at Guildhall, in which registration is decided to be faulty because the name of a firm instead of that of an individual was entered as author of the work in which copyright was claimed. It was contended that as the Legislature gave to the author a life interest in his copyright, the registration in the name of a firm extended that interest to several lives. This argument is ingenious, and appears to have been held to be sufficient; but in photography many cases will occur in which a firm and not an individual is actually and *bona fide* the author of the copyright work. How the law would deal with such a case we cannot tell; but in any case where registration is effected in the name of a firm it would appear to be desirable that the full name and place of abode of each member of the firm should be entered.

An error which is not uncommonly committed by some photographers, in leaving the registration to be attended to by their publishers, who, without any intentional impropriety, enter the copyright in their own names. This does not give them any property in the copyright, but it vitiates the author's property. A common error is inaccurate or insufficient description; and another error of surplusage consists in repeating the registration for each size of the same picture. It is the design of a picture which is protected, and that design is the same if it be contained in a piece of paper an inch square, or occupy an acre of canvas.

It should be remembered also that the photographer does not become the owner of copyright in a portrait which he takes in the ordinary course of his profession in accordance with the instructions of his sitter. An agreement in writing is required in such a case to secure the copyright to the photographer. The photographer becomes the owner of the copyright in any work he may produce, whether it be a study, a portrait, or a landscape, for his own purposes, and not as a commission from a customer. When, therefore, a photographer requests some one to sit to him, and produces portraits either as studies or likenesses for his own purpose, the copyright in such case vests in him. But where a sitter has had his portrait taken in the usual way of trade, and afterwards gives permission for its publication, the photographer acquires no copyright therein without a memorandum in writing in accordance with the provisions of the Act is made and then duly registered.

An open question exists as to when registration should take place to be of value. No action can be taken in regard to an unregistered picture; but a doubt exists as to whether the owner of the copyright may register at any time, and proceed against all infringements which take place after registration. We believe he can do so; but the point has not been decided in a court of law, and hence is practically an open question.

Here is the case to which we have referred:—

"At Guildhall, on Saturday, Mr. James Thomas West, a printer, of Golden Lane, appeared to an adjourned summons before Sir Francis Wyatt Truscott, charging him with infringing the copyright of a picture belonging to Messrs. Lazarus and Rosenfeld, fancy importers, of Bevis Marks. Mr. Crispe appeared for the complainants; Dr. Phillimore for the defendant. Dr. Phillimore said that he could not get publishers to come from Germany to prove publication prior to that by Messrs. Lazarus and Rosenfeld, and he must let the matter rest where it was as regards evidence; but he must urge the objection that he had previously raised in reference to the insufficiency of the registration. In the first place, the authors were registered as Lazarus and Rosenfeld, when it was admitted that Rosenfeld was the sole author; secondly, there was no transfer from Rosenfeld to Lazarus and Rosenfeld; and, thirdly, the Christian names were not mentioned. The summons was taken out under 25 and 26 Vict., cap. 68, secs. 3 and 4, and under those sections the summons could not be maintained. If Sir Francis should decide against him, he must ask for a case to be stated. The learned gentleman then quoted a decision by Vice-Chancellor Kindersley in the case of Sampson Low, Son, and Marston against Routledge, where he held that the Christian names of the parties ought to have been inserted in the registration, and as that had not been done the omission was fatal. In the present case the complainants had done too much, and not enough. They had put in Lazarus's name and omitted Rosenfeld's first name, and, therefore, had not complied with the conditions of the Act of Parliament. He further contended that the entry was incorrect, as it stated that Lazarus and Rosenfeld were the authors when Rosenfeld was the sole author. Mr. Crispe said that as Dr. Phillimore had asked for a case in the event of Sir Francis's decision being adverse to him, he must do the same in the event of its being adverse to the complainants. He then contended that the case quoted was not analogous to the present one, for in it there was the registration of a transfer, and, in this instance, there was no transfer. In that case Vice-Chancellor Kindersley did not decide it on the ground of the omission of the Christian names of the parties, but because the description was otherwise deficient. Mr. Crispe next contended that it was not necessary to put the Christian names in, and that the names of the firm were quite sufficient. It would be hard, indeed, if an inadvertence should deprive a man of a right to his invention. Dr. Phillimore replied that by the Copyright Act the author had a life interest in his invention, and his executors for seven years afterwards; but by registering it in the names of two persons the author got the benefit of two lives instead of one. Sir Francis Truscott retired with Mr. Marten, the chief clerk, and on returning into court said they had considered the case very carefully in all its bearings. His decision was that complainants had not complied with the Act of Parliament, and he must, therefore, dismiss the summons. He made no order as to costs, as it was a very important case. The summons was then dismissed. Mr. Crispe asked for a case for the Superior Court, which Sir Francis Wyatt Truscott granted."

HOW TO RESTORE EXPOSED PLATES.

When Captain Abney read his valuable paper at the December meeting of the Photographic Society, it struck us as not a little surprising that a fact so apparently obvious to experienced photographers as the possibility of renewing the sensitiveness of an exposed plate, and at the same time destroying any action produced by light, had not been noticed and brought to a practical issue earlier. The experience of Daguerreotypists directly pointed to such a possibility. But the modes and materials used by Daguerreotypists differed so essentially from those used by collodion workers that the possibility never seems to have occurred to the numbers of workers who had graduated in both processes. The Daguerreotypist had a surface of silver to render sensitive by contact with the fumes of iodine and bromide, whilst the collodion worker has a surface of iodide and bromide to render sensitive by contact with silver. Re-dipping the exposed plate in the silver bath did not destroy the image and render the plate again sensitive, as did placing the sensitive silver plate over the fumes of iodine. Immersing the collodion plate in a solution of bromide or iodide, and again dipping in the nitrate bath, was the obvious method; but, obvious as it might seem, it did not occur to the thousands of workers to whom such method would be valuable.

Not less curious was the fact that when Captain Abney read his paper, an article by an American gentleman was crossing the Atlantic, giving a practical exposition of the same fact. Mr. W. H. Sherman, an able American photographer and ardent experimentalist, had contributed to *Mosaics* a paper pointing out a simple method of applying this principle to both dry and wet plates. Here is his article.

"It is generally supposed that when a sensitive plate has been once exposed to the light, either in or out of the camera, its usefulness as a sensitive plate is at an end. Either it must be developed and serve in its finished capacity as negative or positive, or be set aside as a failure, to be afterwards treated to the routine of preparation appropriate to second-hand glass before it is again ready for the camera. In ordinary studio work so much of this kind of drudgery must needs be done that it occasions but little compunction to see a plate that has been most carefully cleaned, albumenized, collodionized, and bathed at some cost of time, labour, and chemicals, tossed into the lye-tub or other purgatorial receptacle wherein outcast plates await the renovating offices of the cleaner. Of course, in all developed failures, there is practically (though, as I shall presently show, not absolutely) no help for this repeated preparation; but when it is known before developing that a failure has been made—as, for instance, in the case of a child moving—the plate may be restored or put back again into working order without removing the sensitive film, so that precisely as good a negative or positive may be made upon it as if it were for the first time fresh from the bath.

"With dry plates, especially, the ability to restore and use them, when otherwise they would be useless, is not unfrequently a matter of great convenience and satisfaction. With the exercise of proper care, it is true that a sensitive plate will not be exposed to actinic light until it is in the focus of a lens, with the luminous image upon it. Dry plates ought never to be carelessly or accidentally exposed. There is no denying this; but, nevertheless, neither carelessness nor accidents have been entirely eliminated from photography or photographers. Dry plates, during their entire history, have been remarkable for a trick which they have of getting uncovered. The last person who took one from the box shut the box and locked it; but this box is found open, the door into the room is open, and the plates are ruined, every one. They are worth saving. How is it to be done?

"*Restorative.*—Dissolve 160 grains of bromide of potassium in 8 fluid ounces of water, and add 2 fluid drachms of nitric acid.

"After rinsing the plate under the tap to remove the preservative (if a dry plate), or the free nitrate of silver (if wet), immerse it in the restorative in a pan of suitable size. A few minutes will suffice to undo the work of the light, the time required being proportionate to the amount of exposure. All the care necessary as to the time the plate should be in the solution is that it must be long enough. For a fully-exposed negative three to five minutes will accomplish the desired object. I am in the habit of covering the pan, and leaving it until the next convenient opportunity for removing the plate. A sitting may be made, or one may go to dinner meanwhile. On taking the plate from the solution, rinse again as before; flow again with the preservative (if a dry plate), and place in the drying-box, where it may dry spontaneously; when dry it will be ready for further use, and, as before stated, will be found in every respect as good as new. For wet plates the treatment is to be the same, with the exception that instead of reflowing with the preservative, they must be redipped in the nitrate bath. It need hardly be said that the water used for rinsing, as above mentioned, should be nearly free of impurities. That which I use is from Lake Michigan, and answers the purpose well.

"A plate may be restored after being developed, and another negative or positive taken upon it. Furthermore, the operation may be repeated a number of times, the same collodion film and the same silver being used in each case; but by the wet process, the plate will have more silver after being restored than before. After a plate has been exposed in the camera and developed as usual, immerse in the restorative, to which add for an ordinary bromo-iodized plate an equivalent of iodide of potassium 223 grains, and 2 fluid drachms more of nitric acid. Let the plate remain in this solution until all trace of the developed image has disappeared, which may require twenty-four to thirty-six hours. The plate will now have the appearance of one just taken from the bath. After rinsing to remove the acid and soluble haloids, finish as before directed for wet or dry plates; if for a wet plate, it may be flowed with a weak solution of bicarbonate of soda after rinsing off excess of acid, followed by another rinse to remove the soda before redipping in the nitrate bath; if for a dry plate, carbonate of ammonia or soda may be used to assist in removal of the acid from the plate. When a wet plate is developed, a portion of silver from the free nitrate is reduced upon the parts of the sensitive coating which have been impressed by the luminous rays. In the process of restoring, this additional silver is redissolved by the nitric acid and converted at once into bromo-iodide of silver, so that the plate is richer in silver at the second exposure than at the first, and still more so at the third than at the second, and so on until the film would undoubtedly be broken up by excess of the silver compound.

"As might be expected, instead of the bromide of potassium, common salt may be used as a substitute. I am not quite prepared to say that the plates treated with the latter are not quite as sensitive as those with the bromide, but such seems to be the case. I have experimented with it enough to find that just as perfect results can be obtained on a plate exposed and restored by it and the acid as with fresh plates. The trouble of restoring a plate is hardly worth mentioning. Have a pan, say 7 by 9 or 8 by 10 inches in size, on a shelf in the dark room, containing the acid-salt solution. This should be kept covered or in a stoppered bottle when not in use.

"When a sitter has moved, and you are certain of a failure, remove the plate from the holder, rinse, place it in the pan (in the solution, of course), and cover it by inverting another and a larger pan over it. Proceed with your sittings. Afterwards, when convenient, make ready to do some job of copying, and use the plate from the restorative as above directed. If successful, you will have a clean, brilliant negative on a plate which ordinarily would have been useless until again cleaned and otherwise prepared. For dry plates use the bromide restorative."

A VERY SIMPLE CONTRIVANCE FOR SAVING SILVER.

BY NELSON K. CHERRILL.

I drain my plates before putting them into the dark slide by standing them in a large funnel, which, to keep it upright, and to give it a place to drain into, stands in a wide-mouth jar.

The saving effected by this simple plan depends, perhaps, more upon the manner in which it is applied than in the arrangement itself. I use it thus:—As soon as the greasy marks disappear from the plate, I remove it from the bath, and at once place it to drain. My dark room is so arranged that light does not fall on the plate when draining, even if the door be open, so, if I have nothing else to do, I go out and have a chat with my customer. There is, however, generally plenty of occupation inside, without any necessity to fill up the time, which, however, I always allow before the plate is used.

I have headed this paper as if I considered the saving of silver were the greatest advantage gained by the mode of work advocated: this I do not think the case. I think there are advantages all round ou a system which allows of long draining before the plate goes into the slide. The bath, for one thing, lasts longer and keeps in far better order. The plates themselves are more equal in quality, and give much softer pictures; this advantage is most felt with Rembrandt portraits, of which I do a great number. Then, again, I consider it a great advantage to prepare the plates one under the other, so to speak; *i.e.*, to put in one to the bath as soon as the other is taken out, and put to drain, so that while working, I am always at least one, sometimes two plates ahead. A plate that has been drained five minutes will keep in the slide for another fifteen without any practical deterioration, and, what is very important, without wetting the slide.

The hasty style of work in which the plate is transferred, dripping with bath solution, into the slide, is productive of many serious ills; the slides rot from the corrosive action of the nitrate, the silver is wasted, the floor of the studio gets decorated with needless marks and spots, and, what is perhaps of most consequence—at any rate, from the sitter's point of view—there is no small danger of ladies' dresses being spoiled by the silver droppings on the floor.

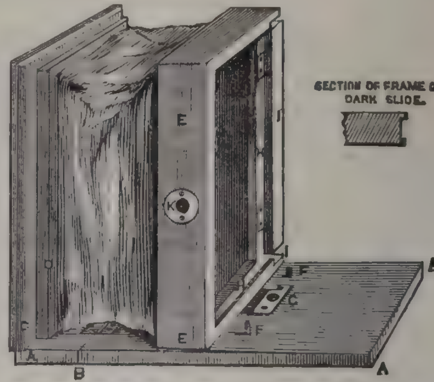
I remember once seeing a photographer trying to take a baby's portrait. The baby "moved," and "moved," and "moved again." Plate after plate was tried, without success, and at last the case was dismissed as hopeless. Meanwhile the dark slide had dripped more than usual, and a fair pool of bath solution on the floor marked where the camera had stood. It was the mother's turn now: "Full-length standing, I think you said," says the photographer. "Yes, I think that style the best." "Then will you please walk round to the table in this way, as it allows the dress to come in better form." And the train of a twenty guinea dress swept gracefully through the said pool of silver solution. That photographer was very wrath with his assistants for some time after the above occurrence.

A PORTABLE CAMERA AND STAND.

BY BAYNHAM JONES.

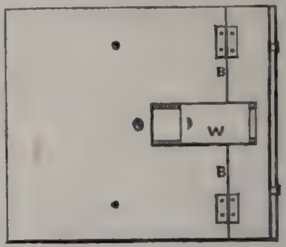
I have great pleasure in acceding to the requests of several members of the South London Photographic Society, who attended the last Technical Meeting, that I would more fully describe my pocket camera and its stand, exhibited on that occasion.

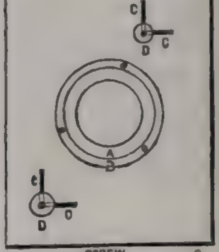
The camera, which takes 5 by 4in. pl ates, measures, when closed, $6\frac{1}{4}$ by 5^{5} by $1\frac{3}{4}$.



No. 1 is a perspective view of it when partially opened. In order more clearly to elucidate its various parts—A A A is the base board, hinged at B, and to which is screwed the front board C, which has a slight frame D attached to it, in the inside of which is fixed one end of the flexible body, made of very thin macintosh, and the outside fits into the camera body E when closed. This latter body is, when open, kept in its place by the two pins F F, which fit into holes in the bottom of the body, and by the screw which fastens the camera to the tripod, and passes through the base board at C.

The dark slides are inserted in the groove H, which has a narrow hinged flap marked I, and prevents the light entering the slide when the shutter is removed. No. 2 is the base board, shown separately, and has a slide W, which, when pushed in, crosses the hinged joint B, and keeps the board rigid. No. 3 is the sliding front of the camera, which carries the lenses, and has two L shaped slots CCC, in which work bolts having milled nuts DD, and by means of which the lenses may be raised in either direction. The front carries two flanges, an outer one, B, having a female screw, into which works a male screw $\frac{5}{8}$ in. long, belonging to the inner flange, for the purpose of focussing, the latter carrying the lens, which is a Ross's symmetrical doublet, $4\frac{1}{2}$in. focus, and covers a 5 by 4 plate admirably. I should





SCREW FOR LEGS OF STAND.

have added that the section of the frame of my dark slides is similar to that in fig. 1, and that instead of the usual wide groove, I have substituted a narrow one, in which only one of the projections works, thereby reducing the bulk of the camera a quarter of an inch. The slides are double, and you have only to reverse them for the second plate.

The Stand.—I need only refer to the diagram in the last Year-Book, page 183. I have made a slight alteration in the triangular top, the screws for affixing the legs being therein described as males. In the present plan they are female. The legs are formed of six pieces of iron gas-tube, cased with brass ⅜in. diameter, and 2ft. 7½in. long, into which are driven wooden rods, in order to prevent vibration; each of these has a screw of the shape and size figured at D, the plain end being soldered into one end of each tube. Into the other end is formed a female screw, so that two of the tubes screwed together form one leg. The three legs are then screwed into the females of the triangle, and the stand is complete.

The Umbrella.—I procured an old umbrella-frame, and cut off the ribs to the length of one inch. I removed the slotted ferrule which carried them, and substituted another exactly similar, with the exception of its containing six instead of eight slots. Into these I inserted six of the reduced ribs. I then drilled holes the size of the ribs in the wood lining of each of the rods, and slipped them over the ribs, which then completed the umbrella frame. I had a case of American leather cloth made, and, after drawing this on, no lady would be ashamed of carrying it down Regent Street.

I am by no means *au fait* in describing inventions, and some of your readers may be sorely puzzled by the foregoing. I can only say I shall have great pleasure in replying to any queries which may be sent to me.

PRINTING-PRESS PHOTOGRAPHS.

BY J. R. SAWYER.

The rapid developments and extended use of the mechanical processes of photographic printing may render a brief sketch of their rise and progress not uninteresting to your readers. Space will not permit of my treating of all the various methods which come under the head of mechanical printing processes, and I propose to limit myself to that branch of it which is known in Germany as the "Lichtdruck," and in England by the names of heliotype and collotype.

All these methods of producing photographs in printing ink have one common basis, namely, the receptivity of colloid or gelatinous compounds to the action of light in the presence of a bichromate salt.

A plate of glass, metal, or similar substance, coated with a solution of gelatine, to which has been added some bichromate of potash or ammonia, and allowed to dry, is in such a condition that light will act upon it in a remarkable degree; and if this coated plate be placed upon a negative in such a manner that the light can only reach it through the various gradations presented by the negative, an exact replica of it will be found on the colloid plate. The surplus bichromate salts being eliminated by washing in water, the plate is allowed to dry, and is then ready for the press.

If the prepared plate is sponged with water, now will be observed the effect of the action of the light upon the plate. Those portions to which the light has not, by reason of the density of the negative, been able to penetrate, receive the water with avidity, whilst those portions to which the light has had access take the water but partially, and where the light has acted most powerfully (that is to say, in the deep shadows), the plate refuses to take the water at all.

The plate is now somewhat in the condition of a lithographer's stone, the main difference being that the water is absorbed by the stone where the drawing is not, and in the colloid plate where the action of light has *not* been.

If a roller charged with suitable ink be now passed over the plate, it will be found that the ink will *take*, as it is called, upon those parts that repel the water, and in precisely the same degree that the various portions do repel the water, thus producing in printing ink a graduated image corresponding to the gradations of light and shade in the negative. So far this is simple. A piece of suitable paper is placed upon the plate, the tympan is lowered, the bed of the press run in, the press pulled, and the result will now be seen.

If the gelatine with which the plate has been prepared happens to have been of a very hard and insoluble character, it may be possible to raise the paper from the gelatine plate without its sticking so tight as to spoil the work; but if the gelatine employed has not been of this character, it will be found that the paper adheres so firmly as to render getting it off, except piecemeal, an impossibility, and this is exactly the point upon which the improvements in colloid printing have turned.

These improvements may be classed under two heads—the one in which the film has been toughened and hardened by the addition of alum, or some such substance, as in the heliotype process; the other by the formation of an emulsion of resinous gums soluble in alcohol, but insoluble in water, and which is the process adopted in Germany.

Before proceeding further, let us examine the image as produced by the ink roller on our moist collotype plate. On the application of a magnifying lens, we shall find that the image is produced in a stipple somewhat resembling that of a mezzo-tint engraving, and that the form and size of this stipple depends upon the particular method used for hardening the plate. In the case of those hardened with alum, the stipple will have a fibrous character; those, on the contrary, hardened by resinous emulsion, will have a regular cellular or honeycomb structure.

Good work in mechanical printing depends not so much upon the method of hardening employed, as upon the constitution of the film, its proper degree of thickness in reference to the work which it has to do, and the care and accuracy employed in making it.

The material which seems best suited for the support of the colloid preparation appears to be thick plate glass, very finely ground on one side. This should be rendered absolutely clean by the most careful use of detergents, such as ammonia and potash, rinsed with distilled water, and allowed to dry. The plate is then placed upon a level stand, and a three per cent. solution of gelatine mixed with half its weight of albumen and one per cent. of bichromate of potash poured upon it. This is allowed to dry in a horizontal position in a hot closet; when dry, it is placed face downwards upon a piece of black cloth or velvet, and exposed to the light, which, passing *through* the glass, attacks the back of the plate. It is now ready to receive the second coating, which consists of a solution of gelatine twelve per cent., mixed with an equal bulk of solution of isinglass five per cent., and two or three drachms of an alcoholic solution of gum myrrh, benzoin, and lupuline. This compound, made sensitive by the addition of a bichromate salt, is carefully strained whilst warm through very fine muslin, and forms the second preparation. It is applied as follows:—Take the already coated plate, and plunge it into warm water of about 120° Fahr.; this will wash out the surplus bichromate in the first coating, and leave it in a sort of spongy condition, admirably fitted for the reception of the second coating. The plate is then placed upon a level stand, and sufficient of the second coating poured on it; it is then allowed to dry in a warm place, carefully avoiding dust, and, when dry, is ready for exposure under a negative, and subsequent printing in the press.

The question of rapid printing from plates prepared in this manner has cropped up very frequently of late. There is no doubt that work of a certain class can be produced in a steam press, and at the rate of many thousands per diem; but no work requiring skill, care, and attention can be produced from collotype plates, except by skilled handlabour. Any one who has seen a first-rate collotype printer at work has seen how carefully the sponge has to be applied, how one part has to be insisted upon more than another, how the deep shadows are first rolled in with strong ink, the half tints and the lighter portions of the picture with a lighter and thinner ink. Any one who has observed this will probably come to the conclusion that fine collotype work can no more be produced by machinery than delicate etchings and first-class engravings. In collotype printing, as in many other things, it is not so much the materials that are employed, as the care, skill, and experience in their adaptation for the purposes required.

NOTES ON CARBON PRINTING.

BY THE ABBE LABORDE.[*]

SEVERAL times there have been notices on the defects that occur in pigment printing; but as I have never encountered any difficulty in the manner of proceeding adopted by me, I think it might be useful to make it known.

I dissolve one gramme of bichromate of ammonia in twenty cubic centimetres of water, to which I add twenty ditto alcohol. Instead of plunging the tissue in this solution I fix it on a support, and pour over the gelatined surface a small quantity of the solution; it spreads readily, and its flow may be aided with a glass rod. After having inclined the support for about a minute, an operation that can be performed in the daylight, I throw off the excess liquid, and suspend the tissue in a dark place. Two hours are sufficient to dry it completely. I have even sometimes employed tissue half an hour after its preparation.

Each sheet having been sensitized and promptly dried, they will be found in a condition to keep for a long time and preserve their value. The alcohol gives firmness to the gelatine, and if sensitized in too warm an atmosphere the prepared layer does not dissolve, as with the ordinary bichromate solution.

One fact that will at first appear singular is, that in the intense heats of summer the tissue dries slower than in the winter. I attribute this to the following cause: that the gelatine becomes slightly sticky at a high temperature, and *retains* the humidity.

I make use always of a solid support, glass or porcelain, in *unfolding*[†] the image, which is better than the paper. After the exposure the paper is plunged into water, and before applying it on the support care must be taken that the swelling of the gelatine has subsided. This method has many inconveniences: the parts swollen are injured to a certain degree under the pressure used to drive out any superfluous water remaining, the parts in relief separating from the support; and it is these precisely which ought to adhere most firmly, as they form the design. It will be noticed very often, too, that the thick blacks become detached on *unfolding* the image.

After printing, I dip the paper into water, but I do not wait till the gelatine is swollen to apply it to the support. It will be noticed, in consequence, that the adherence is more complete, and that the pressure used on the back of the paper has no effect on the image, only it requires a temperature slightly higher for unfolding in water. In spite of these precautions, there are times when the deep blacks come away from the supports. I have tried many substances which give a greater adherence, but they all tend to render the gelatine insoluble, which is to be carefully avoided. It appeared to me that a solution of boracic acid at 2 to 100 was preferable. It can be poured over the support, and then applied to the moistened sheets.

We find in the prepared commercial tissue greater sensitiveness and more finished appearance than in others; but the image that they give shrinks, and, to a certain degree, becomes displaced in the water, be it but a little too warm. Only with the greatest caution is success obtained. These inconveniences disappear when we sensitize with a solution of *chromate of zinc*. I have then been able to *unfold* an image in boiling water, though, indeed, somewhat weakened, but it adhered well to its support, and appeared without any loss of form.

I mention this experiment to show the value of chromate of zinc, but, in using it, it should not be employed pure, as it gives too much harshness to the sensitized tissue when it dries. To obtain the desired effect, you add a little to the ordinary solution—two decigrammes, for instance, to one gramme of bichromate of ammonia. This property of the chromate of zinc merits a trial in experimenting in the many processes of photo-lithography. The relief appears to me less striking in the image it yields—a circumstance which would be advantageous under the roller, as only the hollows take the ink. This preparation is made by a saturation of carbonate of zinc in chromic acid.

We may easily obtain vitrified portraits by the following method, the principle of which only I can indicate at this moment:—The image having been *unfolded* on a surface of enamel, glass, or porcelain, is then immersed for some minutes in a solution of vitrifying salts, generally chloride of gold. The excess of this liquid is removed by washing, and, after being dried, the image thus prepared is burnt in.

A TRIO OF SUGGESTIONS.

BY W. H. TIPTON.[*]

OUTSIDE of the absolutely necessary paraphernalia of a photograph gallery, I would suggest as one of the most useful, a good reliable amateur printing-press, with from six to a dozen, or even more, small fonts of various size and styles of types. Wood-cuts and electrotypes are now made very cheaply from any design furnished. Photographers can have special designs of their own always ready for printing the ends of their stereo. views, backs of card mounts, &c., in just as neat a manner as they can be executed by most practical printers, if he takes proper care. For printing envelopes, business cards, circulars, and the thousand and one things of the sort required about the gallery it will save itself over and over again every year. A "Novelty" in use in our gallery since 1873 has not cost a penny for repairs, and still works like a charm. About twenty fonts of type and as many electrotypes have accumulated. In nearly every establishment one can be found who will delight to work it

Another very essential article, not only in the gallery, but any business place, is the letter copying press, or one of the various copying books that requires no press, several of which from practical experience I know to do their work. Much inconvenience and annoyance is avoided by preserving copies of all letters and orders, and not unfrequently cash is saved and made.

Lastly, and to complete the trio, I would suggest, as almost indispensable, a good clothes-wringer, not to wring your pictures through ten or fifteen minutes after they come from the hypo, as I have seen recommended, for that is all bosh, but after they are thoroughly washed. Take from the water one at a time, and place on top of others till you have three or four dozen, put between two pieces of cardboard, or, better still, between one piece folded, pass through the wringer, and mount in that condition if prints have been cut before toning; if not, hang up or spread out to dry. Pictures wrung out, dry in half the usual time. And now, perhaps, it would be well enough to "suggest" that the writer has no interest in the sale of any of these articles, but does have an interest in the welfare of his fellow-craftsmen, and is always ready to contribute anything that may be of value to them.

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[*] Read before the French Photographic Society.

[†] I employ this expression "*unfolding*" in preference to the word *developing*, generally adopted. This latter word ought to be reserved for designating the action of sulphite of iron, pyrogallic acid, or alkaline mixtures, for, indeed, we do not develop an image which is advanced in existence, and impressed on the paper; we only *unfold* or skin off (*depouiller*) the foreign substances which cover the hidden figure.

[*] *Philadelphia Photographer.*

ART IN PHOTOGRAPHIC EXHIBITIONS.*

The question is often agitated by originators of art enterprises whether photography belongs to fine arts. Thirty years ago the Daguerreotype infringed upon the liberal patronage extended to the painters of miniature likenesses, as large portraits were then only indulged in by a few wealthy families. During the past twenty years photography has made wonderful progress, both in popular esteem and in artistic quality, until the portrait painters acknowledge it as a formidable rival. They would fain decry its merits, but their criticisms are constantly disarmed by use in the preparation of portraits. Formerly the artist would secure fifteen or eighteen sittings from a patron, but now the usual custom is to obtain a preliminary photograph, to outline the figure on the canvas on an enlarged scale, which is constantly corrected by the callipers, and after the first sitting for general likeness and colour, to paint the drapery from the lay figure, guided by the appearance in the photograph, so that the man of business or the lady of fashion feels that only time can be given for three full sittings. The painters and sculptors will not accept the photographer as an artist, as they claim that his work is the result of mechanical and chemical processes, and does not depend on the necessary quality of design in all artistic work. Still the best photographers study as critically their composition of groups, arrangement of drapery, and position of the individual as can any one using the brush, and the very difficulty of arranging the focus for all portions of the body, and the distortion in shape and size according to the respective distance from the optical centre, cause the operators to take great caution. With the advance of the profession, no operator can retain his position in a first-class gallery for a single week whose attainments are not greater than a complete knowledge of chemical and mechanical operations.

The want of recognition of photography is a fashion, the relative rank being that accorded in the infancy of the profession, and this is perpetuated by its management as a business. The operators and even the art assistants in crayon and water colours are unknown to the public, the work being credited to Black, or Sarony, or Gutekunst, without any notice of the individual professional talent employed, a system not conducive to the production of individuality of work, only so far as the proprietor of a gallery may have artistic skill, and is thus able to use his several employes as instruments to accomplish special ends. Yet no skill can elevate the work of artizans to lofty standards until they become artists, with quickened brains, and fresh, original ideas.

The press has been forced to draw a broad line between artists and photographers, not alone because of the sensitiveness of the former class, but also from the unwillingness of the latter to submit to the fresh, healthy criticism which the painters must always meet. Like the artists of the whole West, they exclaim that the time has not yet come for a full and free statement of merits and demerits, hence notices can only be given in a general manner, and it is only occasionally that a man can be found who courts the most candid examination and close discrimination of his work. A few months ago the experiment was tried of visiting the principal galleries of Chicago, and while the proprietors would gladly have paid money to obtain flattering notices, yet they instinctively shrank back from the trenchant pen freely employed to review the productions of the artists, and were offended at the plain words of disinterested criticism.

There is very much in the profession of the photographer to command high respect, and it is confessedly so much the popular portraiture of the day that it is knocking loudly for admission into artistic circles. The display of the American photographers at the Exposition Building in this city for a few days of July, 1874, was one of great interest, though no discrimination was made, and thousands of inferior pictures were displayed; yet two months later the photographers were reluctantly admitted to a small space in the art hall, and the next year they were excluded altogether. The principle of hanging in the fall of 1874 was the only admissible one in connection with an art hall, for the manager arranged them on the walls, according to intrinsic worth and to secure the most desirable general effect, but there was no previous selection, and all were allowed to furnish the same number of pictures. It might seem to many a backward step, and the art committee of another year might feel that it was an ungracious task, since the novelty of the step would provoke much adverse criticism, and few photographers have sufficiently advanced ideas to accord with the scheme; but it might not be a bad movement to make similar advances to photographers as to artists, selecting the best photographers, not alone of the United States, but also of India, Austria, Germany, France, and England, to solicit choice examples of their best work in all departments and affording also to local operators the opportunity of presenting works of real merit.

All the common groups of pictures in one large frame should be positively excluded, both as inartistic in arrangement and positively uninteresting, for if a small picture has merit, it deserves to be studied independently, and no multiplication of similar forms can add worth where it does not really exist. Merit should be the only question governing admission, though the space accorded by the art committee would necessarily limit the number of any special class of pictures to be accepted. Variety would be necessary to secure public attention to the collection, and as the fields of art based on photography, such as the prints finished in crayon, or in water colours, or in oils, crayons drawn after photographs, and similar pictures, might properly be included, there would be no reason why this portion of the art display, by judicious pruning and efficient management, might not be made as profitable in developing a love for fine art as any of the departments with more lofty aims.

Correspondence.

WHERE TO BUILD PRINTING ROOMS?

Dear Sir,—Can you or any of your numerous correspondents kindly inform me which locality in the N. or W. districts of the suburbs, or within an area of a few miles, is best for erecting a printing establishment—that is, which part or parts are freest from fog?—I am, dear sir, yours truly, Thomas Fall.

Proceedings of Societies.

Photographic Society of Great Britain.

The usual monthly meeting was held in the Water Colour Gallery on the evening of Tuesday, January 8, Mr. Glaisher, F.R.S., in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the society:—Messrs. W. S. Hobson, Carl Norman, and William Cobb.

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* *From Chicago Saturday Evening Herald.*

Captain Abney, R.E., F.R.S., then read a letter as addendum to his paper read at the last meeting, a copy of the letter having been sent to the journal (See Photographic News, p. 614, vol. xxi. He added a few remarks, and referred to a conversation with Mr. Pearsall in relation to some experiments by Sir William Grove made many years ago, which his (Captain Abney's) experiments threw some light upon. Sir William Grove found that on placing a piece of tinfoil on a sensitive plate, and then passing an electric discharge through the foil, no reduction took place where the tinfoil had been on applying a developer, although some appeared at the edges. Captain Abney suggested that the ozone developed had destroyed the image resulting from the electric spark, in accordance with the results he had described.

Mr. Pearsall confirmed Captain Abney's statement of Sir William Grove's experiment.

Mr. S. Davis referred to the fact that, whilst the image on tannin plates faded if much time elapsed between exposure and development, when gallic acid was used it preserved the image. Tannin was not an oxydizer, but a reducing agent.

Captain Abney said gallic acid was an oxygen absorber.

A conversation, as to the use of the term oxygen absorber and reducing agent, followed.

Captain Abney said, without discussing the reducing power of the two agents, he found, as a matter of fact, that gallic acid was an absorber of ozone, whilst tannic acid was not. The latter substance was not a reducer of bromide of silver.

Mr. Vile's paper on micro-photography was read by Captain Abney, and an example exhibited.

The Chairman, in commenting on the excellence and interest of the paper, and on the fineness of the example shown, said he should be glad that at the next meeting Mr. Viles would be present to give them personal explanations, and show further examples.

Captain Abney said he would recommend experimentalists not to bother about achromatic lenses, but use a mono-chromatic light in such work.

Mr. Dallmeyer, speaking of the excellence of Mr. Viles' examples, said to him one of the greatest points of importance was the fact that they were permanent prints. He had some very fine examples, printed in silver, which were nearly faded out. The importance of micro-photography could not be well over-estimated. Colonel Woodward had shown that objects could be clearly photographed which could not be made clear to the human eye, even by the aid of the microscope.

Mr. E. Cocking read a paper on the "Art Aspect of the Late Exhibition."

The Chairman called attention to Rule 7 of the Society, relating to the election of officers, details of which would appear in the Society's Journal.

Mr. Kennett showed some negatives on gelatine emulsion, and some prints to illustrate their rapidity, some of them being good pictures with manifestly instantaneous exposure.

Mr. Harman read a few remarks to show that wet collodion was more rapid and useful in a studio than dry plates. He had that morning (and did, in fact, every morning) taken six negatives before breakfast, and printed, toned, fixed, washed, and mounted fifty prints by twelve o'clock. He did not think this could be so well done using dry plates.

Mr. Lane showed his improved portable camera.

The proceedings then terminated.

South London Photographic Society.

A popular meeting of this Society was held in the rooms of the Society of Arts on the evening of Thursday, January 3rd, Mr. Frank Howard in the chair.

The minutes of a preceding meeting having been read and confirmed,

Mr. York proceeded to give an interesting display of photographic subjects by the aid of the magic lantern. An achromatic prism, giving similar definition and brilliancy as a double combination lens, was used. A double convex crown lens is cemented to the prism, giving achromaticity without any diminution of light. The stories of "Jane Conquest" and "Gabriel Grubb" were illustrated by slides taken from life; and a young lady—Miss Alice Burnella—added to the enjoyment of the evening by reciting Jane Conquest's story. The evening was regarded as one of the most successful popular evenings the Society has had.

Photographers' Benevolent Association.

The Board of Management of the above Association held its monthly meeting on Wednesday, January 2nd, at 160a, Aldersgate Street, E.C.

The following gentlemen were elected members of the Association, having been proposed by Mr. Lavender, and seconded by Mr. Hall:—Messrs. Staples, Pember, Howard, and Hackett.

The balance sheet and Secretary's report for 1877 were approved. The Board then prepared their report for the annual meeting, which, owing to the number of members present being insufficient to constitute a General Meeting, was postponed till February 6th, at 8 p.m. Members are particularly requested to note the date, and to favour by their presence and that of friends on this occasion.

To Correspondents.

E. H. Parkin.—The maker's name on your lens is that of a respectable Paris optician, and it will probably be as good as most French lenses are. The size of a lens is no necessary indication of its capacity. The camera suited must depend upon the focus of the lens and of the size of the pictures it will produce. Hold the lens in a position to make it throw the image of the window of the room upon a white sheet of paper placed behind the lens. The distance between the lens and the paper or screen whereon the image is formed will give you some idea of the focus, whether eight, ten, twelve, or more, inches. If ten inches, you may get a camera for eight-inch plates, and in such proportion a bellows camera has many conveniences. From the varying sizes of the lenses, it is not improbable that this is an orthoscopic lens. Of what form are the lenses?

Waste Not.—Add liver of sulphur, and throw down the silver as a sulphide; then reduce in a crucible. You will find fuller details than we can give here in various articles in the News and also in our Year-Books.

Gus. M.—The reason for the film dissolving on varnishing is that the pyroxyline in the collodion is soluble in alcohol. Some samples are so when first made; but the solubility is generally the result of a change or decomposition in the collodion, brought about by age. The collodion becomes rotten and powdery, and the film readily dissolves in strong alcohol. Weak gum water or dilute albumen protects the film from the action of the alcohol, and so saves the negative. To your second question, yes, frequently. We will, however, write.

J. C.—We do not see any reason to believe that any higher degree of permanency would be secured by the use of hyposulphite of ammonia. This salt has been made experimentally, but it is not generally to be had in commerce. It is difficult to crystallize, and therefore generally sold in solution.

F. W. Broadhead.—The collotype prints had not arrived when we last answered you. Since then some such prints arrived with no name, so we cannot identify them. They are probably yours. They are promising for beginners, but they do not possess the delicacy which may be attained in such work. Experience will probably improve that.

A. E. S.—Experience is the chief guide in working enamel photography. A series of articles by a skilful practical worker will appear in the next few numbers of the News. Ammonia is a solvent of chloride of silver. The precise strength used for the purpose we cannot say. Each worker has his own method of getting rid of the chloride of silver. If not removed it will give the enamel print a yellow tint. The colour is the test of its perfect removal. Ammonia could be used for fixing negatives and prints. But imagine how you would like to work with it on a large scale! The effect on the eyes, if very little is used, is very trying. An emulsion is opposed to a solution. An emulsion consists of exceedingly finely divided particles held in suspension.

L. S. D.—We should be much disposed to attribute the defect to the plate glass used, which possibly has a defective surface. If not to that, we should suppose the waxed surface of the glass had become dusty or imperfect. The defect is one of surface in the collodion, and not of tissue.

Frank Sutcliffe.—Many thanks. We received the block too late for last sheet of Year-Book. We shall insert in the News. Can you favour us with a few details for publication.

W. T. Watson.—Thanks We shall be pleased to receive your communication. If we can arrange for time, you shall see the proofs in question.

T P.—Not out yet. We look with interest for the specification.

Decor Inemptus.—In our next.

Several Correspondents in our next.

The Photographic News, January 18, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

The Athenæum on Photographs for Book Illustration—M. Braun's Photographic Establishment at Dornach in Elsass.

Not content with anathematising photographs from an art point of view, the *Athenæum* now points out that camera pictures are to be avoided in books of travels and works upon foreign countries. Somebody has lately written a book about India, and has had the bad taste or stupidity to illustrate it with photographs of some of the temples and localities of the empire. The *Athenæum* tells its readers that it "was a great mistake to illustrate such a volume by means of photographs;" and it informs us why: "Photographs are not only inartistic, but give a book an ephemeral appearance." Besides, as the farmer said of his portraits, they are so beastly like. This our contemporary does not say, it is true, but he implies something of the kind when he goes on to observe: "The illustrations should all have been either steel or wood engravings." In that case, we suppose, they would have been considered very artistic, and would have been free from that nasty realism which pervades all photographs. What the *Athenæum* would wish to see, doubtless, are those charmingly executed cuts to which it has so long been accustomed: lofty palaces rising to the clouds; magnificent cities showing nothing of the unromantic dirt and squalor about them, but only the temples and dwellings of the grandees, with just a suggestion of the snowy Himalayas in the distance; broad rivers flowing through the land, their banks picturesque with exotics and luxuriant foliage, with now and then a plump native launching his canoe into the stream—no jungle, no dismal swamps, no half-fed Hindoos should obtrude to mar the artistic effect of the sketch. Of course, for those who want to foster ideal fancies of the East, or retain their foolish ideas of its universal magnificence, there is no doubt engravings on wood or steel are best; but, unfortunately, people are beginning to mistrust engravings, and when they visit a spot, or desire to see something of a place they have read about, they choose camera pictures in lieu of the best cuts upon wood or steel. No one, if he were interested in Chamounix or Mont Blanc, would now-a-days think of purchasing an engraving of it; and old Indians, as well as young students, would far sooner, we opine, look at a camera picture of Lucknow or Lahore, where they have been, or are to be quartered, than the best sketch upon wood ever executed. Yet we have the *Athenæum's* word for it that photographs are unsuited for books that treat of foreign countries and strange scenes, and that such works should be supplied with either steel or wood engravings.

M. Braun's Photographic Establishment at Dornach in Elsass.—The death of Adolf Braun (or M. Braun, of Dornach, as he was usually called) brings to mind that gentleman's famous photographic establishment, where carbon printing has been carried on uninterruptedly for more than a dozen years. Few photographers have had the privilege of visiting the famous establishment, where upwards of one hundred hands were daily engaged in various photographic labours. Indeed, there are not many, we think, who know where Dornach is. It is a little village in Elsass, on the borders of Switzerland, near Basle, and nearer still to Mulhouse. We had the pleasure of visiting the famous studio some ten years ago, if studio it could be called, and we have still a vivid idea of the grand scale upon which all the manipulations were carried on. Dornach was in France then; now it is German soil. You passed through Paris and took a ticket down as far as Mulhouse by the Paris-Basle line, the only one in our experience upon which travellers are well cared for in the matter of eating and drinking. The station of Vesoul, about midway, has had many a passing benediction bestowed upon it, and we shall not hesitate here to say a word in its praise. In the morning it is a *dejeuner*, in the evening it is a *diner* that is served. The guard officiates as waiter, and at a station some fifty miles before the flying express train gets to Vesoul he comes round to every carriage and takes orders. Perhaps twenty travellers order dinner, and this number is rapidly telegraphed on. An hour afterwards the train runs into Vesoul station, and there upon the platform, ready waiting under the superintendence of smart, white aproned *garcons*, are a number of pillar-like baskets. There is a few minutes' wait sufficient to convey the dinner baskets into the proper carriages, and in a trice the engine whistles and is off again. You examine your basket (for which, by the way, you have just paid three francs), and find upon the top, which forms a table, are serviette, salt and pepper, a knife and fork, half a bottle of wine, half ditto of water, a glass, and a crusty white roll. You take the upright sort of rabbit-hutch between your knees, and then open a wicker door, which displays three shelves, upon each of which is a tempting *plat*, with cheese and fruit at the bottom. First comes a piece of beef stewed in vegetables, all smoking hot; then a piece of savoury *pate*; and thirdly, the leg of a chicken and salad. You eat leisurely of one dish after another, returning the plates into their places when done with, and sip your claret as you now and then glance out of window at the moving green panorama before you. The wooded hills of beautiful Elsass pass by as you dine, and it is idle to deny that the novelty of the affair aids in one's enjoyment. An hour passes, and the baskets are put out at a station, and you then recline comfortably upon the cushions, smoking lazily or dozing, until Mulhouse is reached. Dornach is but a few minutes' ride, and anyone will tell you where to find the Braun establishment. We do not suppose that the place has much altered since our visit, for the firm makes quite as many pictures as formerly. Carbon tissue is made upon the premises ready sensitized, and very large quantities were used at the time of our visit in the reproduction of works of art from some of the European galleries, for which M. Braun had attained a great reputation. No less than five photographers were employed at that time in various parts of Europe taking pictures for the Dornach establishment, the negatives being transmitted as soon as possible to Elsass. Silver, carbon, and Woodburytype were all in working order at the time of our visit, and carbon, worked there upon the Swan process, was used for printing all the classic work. Besides the works from European galleries, the Braun firm executed a very large number of Swiss pictures. The large panoramic views, taken, we believe, by the Johnson panoramic camera, have never been surpassed, and the firm spared no expense to secure fine negatives. The *costumes Suisses*, some of which were magnificently coloured at Dornach, also achieved a great reputation, and were largely on sale at Paris especially, where M. Braun had a depôt for the sale of his productions. The smaller *costumes* (of cabinet size) were printed in Woodburytype, and we have now before us a specimen we saw printed at the time of our visit. Silver printing was employed only for stereoscopic views and other small work. In no other country, we believe, is such an extensive and complete photographic establishment to be found; and if we owe nothing else to M. Braun, photographers are, at any rate, indebted to him for being the first to take up permanent printing in a thoroughly industrial manner, and to demonstrate its practical value by producing hundreds of thousands of pictures.

STRAY THOUGHTS ON THE EXHIBITION.

BY EDWIN COCKING.[*]

Upon these walls have recently been seen specimens of the results of one of the most wonderful operations of nature that we, who live in the present epoch, have been privileged to discover, and make known; and, unlike most other discoveries which arise from scientific investigations, this one, from the moment of its birth, became closely allied, as a matter of necessity, with one of the emotional faculties of the human mind, viz., the pleasure arising from pictorial representation, and thus were brought together in a perfectly new combination, to be for ever united, emotional feeling and scientific fact; hence we designate our work the art-science of photography.

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[*] Read before the Photographic Society of Great Britain.

And whilst so much has been said respecting the claims which photography has made to be admitted into the temple of fine art, it would be as well just to arrive at some definition of this capacity which this art-science possesses for the production of pictorial works. I think it will be admitted that, in fine art, the materials are so plastic that they follow and obey the also plastic emotional feeling which guides their use, and hence, in fine art, an imitation is something independent of, and different from, the sentiment of the object imitated. In photography the materials are not plastic, being unyielding scientific facts, which, in their working, are not subject to plastic emotional feeling, and hence an imitation is a something dependent upon, and cannot differ from, the sentiment of the object imitated.

Assuming this proposition to be correct, it will be evident that the results in each case must always have a separate individuality, and so should not be brought into comparison with each other. It is as well to have some definition, such as this, strongly impressed upon the mind, because, if the actual capabilities of photographic art are clearly understood, I think we should hear less of that spirit of condemnation which delights in looking down upon photographic results from the high standpoint of fine art, as if the two were identical, instead of being quite different; for photography is a new pictorial power, which, although requiring artistic cultivation for carrying out its highest aspirations, can never come into direct contact with fine art, by which is meant that it starts as a new and distinct phase of art. Photography runs its own separate course, and so must be judged entirely on its own merits.

Having thus cleared the way by stating my views of the capabilities of photography, I now propose to see whether, from a study of the pictures that have been exhibited, any lessons can be gained which may, in however slight a degree, help forward the artistic side of our art-science.

In looking at a collection of pictures, where absolute nature has been the model, one cannot help being struck with the singular fact of the more or less absence of abstract beauty, and this applies with most force to the human face. Why should this be so? One would have thought that where it was the intention to produce a picture, it would be the main desire and object to secure such models as possessed in themselves beautiful forms. I cannot see why, with the knowledge which everyone has of the impossibility of the scientific portion of our work being able to alter what is given it to do, better, if not perfect, models are not selected. Possibly, it may be that abstract beauty, when photographically depicted without some kind of expression, becomes devoid of interest, and this leads into another phase of our work, wherein it differs from that of the painter, viz., that the photographic art student has to bring into play a moral power, which works by influencing and bringing out of the model the mental, or rather sentimental, expression which the subject is intended to convey. This, of course, implies that the model is capable of enacting the part; at the same time, there is room for much skill and judgment in deciding when the expression is evident, and it is just the possession and cultivation of this faculty, in conjunction with a knowledge of the laws which govern art-composition, which will determine the ultimate art-value of the work done.

Then, again, in the composition of the leading or prominent lines of a picture there is too often the absence of beauty, not so much in this instance the absence of beautiful form, as a want of knowledge of some of the simplest or elementary rules of fine art, the result being that the educated eye becomes irritated, and cannot derive pleasure from other qualities in the picture which may possess value.

Too often we found that the head was placed in a position always suggests a want of purpose in the object; but there completely perpendicular in relation to the body, which almost were many works exhibited where great attention had been given to this matter, and the result was a pleasure to the beholder, arising from both the artistic faculty and the mental sympathy being satisfied.

Another thing was the tendency to place figures too low down on the space apportioned to the picture: no doubt this arose from our scientific facts being found somewhat difficult to be made subservient to artistic requirements; nevertheless, the result was not pleasing, the balance of parts and quantities not being satisfactory, and this leads to a most important section of our subject, viz., the subordination of one part to another. Now, this is one of the most difficult things in photographic art: we either see the entire surface of a picture rendered with equal minuteness, or else some parts so glaringly deficient in outline that the result is not in artistic keeping, and, consequently, does not give pleasure; also, why should it not be possible to arrange the component parts of a picture in its light and shade, so that we could have one extreme dark and one extreme light, all the rest being in proper gradation of tone? In other words, not the absence of sharpness, only the placing of it in its right position as to retiring or coming forwards. Something of this kind has been attempted where backgrounds occupying a large portion of the picture have been made dark, or in comparative gloom; but this is not satisfactory or in keeping, because it frequently has the effect of making the figures appear as if taken when the sun shone direct upon them, whilst the background and accessories were taken without the sun shining at all.

In the Exhibition were some works which afforded excellent examples of what I have endeavoured to explain, viz., subordination of parts. I refer to some specimens of mechanical printing—the originals being engravings from paintings, which very decidedly possessed all the attributes that, I think, ought to be attempted in photography. And it is from engravings and reproductions in black and white that photographers can gain many practical suggestions, by a careful study of the light and shade which such works so clearly reveal to us.

One very singular fact must have forced itself upon all who were capable of being moved by pictorial expression: that as photographic records of the human face must so decidedly reveal what is passing in the mind of the model at the moment, that unless the exact expression desired is portrayed, what is done may not only be just something else, but also may really look like some inanimate object which has no capacity to express anything; hence the picture presents an anomaly, inasmuch as the figures appear to have got into the wrong place and mean nothing

This matter involves, on the part of the photographer, a peculiar faculty—that of reading character and determining the exact moment when the model, having responded to his influence, appears to him to express the sentiment he wishes, and here, again, is met one of the greatest difficulties in the way of the photographer who aspires to depict any incident of an emotional nature; he has to choose models who not only may look like and enact the character to be portrayed, but who also must be subject to the sympathetic influence of the art operator in working them up to the desired expression.

The difficulty of securing models, more especially where several figures are required, makes it a matter of necessity that several negatives should be employed to make one picture. This, which is called composition photography, requires so great an amount of manipulative skill in the subsequent joining together of the separate parts for each individual copy, that it would almost appear not to be the way by which future works can be produced. However, when the capabilities of the flexible materials which we have now at our command for making negatives are well understood, and which seem from their very nature admirably adapted to the requirements and necessities of composing one picture from many parts, let us hope that a new era will dawn upon us, and that we shall see the walls of our exhibition well covered with pictorial efforts which will raise the status of photographic art in the estimation of the picture-loving portion of the world.

Naturally, as an artist and painter myself, I look at the art side of our work with more interest than at the scientific, because, at a public exhibition, it is the emotional faculties we appeal to, and success must depend upon the amount of interesting works we submit to this feeling, which leans to the pleasurable rather than the instructive. And hence it is, I see, that photography, being a new pictorial power, must in future be taken up by those who, cultivating their artistic faculties to the greatest extent, will make their works not only take rank in photographic status from their own inherent art completeness, but also supply the evident want of the age, viz., pictorial works which illustrate the various phases of nature in its human interest, and which, from the necessity of their always presenting fac-similes of what has been in existence (and the originals, therefore, capable of feeling the sentiment shown) must command the sympathy of all who can respond to what is evidently true, and thus our art-science will fulfil one of its missisons in conferring pleasure upon mankind.

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ON THE PRODUCTION OF ENLARGED PHOTOGRAPHS OF MICROSCOPIC OBJECTS.

BY EDWARD VILES.*

THE photograph of the *Proboscis of the Blowfly*, which is now before you, has the dimensions of thirty inches by twenty-four inches, and is, I believe, the largest microphotograph which has yet been produced. The difficulty of photographing this object is, doubtless, well enough known to several present.

First let me direct your attention to the fact that the photograph shows the object entire, as it appears when viewed under a power magnifying 200 diameters—or, rather, I should say, it is absolutely 40,000 times larger than the object is in reality, as may readily be shown by a pair of compasses and a rule; and, moreover, that the whole of the proboscis is under the eye, on a scale large enough to show all the details fairly well; but with a magnifying power of 200 diameters, the whole of the proboscis cannot be seen at once in the microscope, but this power requires a quarter-inch objective—a lens with a limited field of view.

Wishing, however, to obtain a photograph showing the entire proboscis, and not a portion of it, I selected a microscopic object-glass whose angular aperture was sufficient to comprise the whole of the object within its field, and attempted to secure the enlargement direct by removing the sensitive plate to a great distance from the lens. Theoretically this should give all the amplification required, but in practice there was not only the difficulty of deficient illumination to contend with, but a limit was soon reached, beyond which sufficiently sharp definition could not be obtained. The result of "straining" a lens is familiar to most photographer, and needs no further explanation. I may mention that in practice I have found eight feet to be the greatest possible distance which can intervene between the microscopic object and the sensitive plate, and it is much better not to exceed three or four feet.

But the image at that distance, where the definition began to break down, was far from being large enough for my desires, so I endeavoured to get rid of the difficulty by using an amplifying lens—analogous to an eye-piece. This gave all the magnifying power wanted, but, comparatively, the enlarged image was a mere blur. I was, therefore, under the necessity of reverting to the plan of making a small perfect negative, and afterwards enlarging it as much as the sharpness of the photograph would allow. The results are now before you.

By means of a ⅔ O.G., a negative was taken on a quarter-plate; this, to the eye, appeared beautifully sharp, and was an enlargement of 20 diameters.

A four-inch O.G. (power about 12 diameters), was now screwed into the microscope, and the negative placed on the stage; as it was to be enlarged 10 diameters, it was necessary that it should bear this power. At a glance, however, it was seen that the sharpness was nowhere, and that, in spite of all the pains taken, the negative was very much out of focus.

It was not until after many trials that a sufficiently sharp negative was obtained; but at length success crowned my efforts. Close examination will show that the large picture is not absolutely sharp; this is due, not to any want of definition in the small negative, but to a cause which will be presently explained.

The enlargement was made by means of a solar camera fitted with a condensing lens of 20in. diameter, and, therefore, commanding an immense power of light. As specimens of this method of enlargement, these prints—absolutely untouched in every respect—will have an interest to photographers over and above that which may attach to them from a microscopical point of view.

Time will not allow me to describe the apparatus any further than to say that the sun's rays are made to fall continuously upon the condenser by means of a heliostat, which consists essentially of a mirror mounted on a polar axis in a manner similar to an equatorial telescope. As in the latter instrument clockwork keeps a star constantly in the centre of the field of view, so, in the former, clockwork serves to make the mirror turn from east to west with a velocity equal to the rate of the earth's rotation. By this means the negative is kept constantly illuminated by the condensed sunlight. The slight want of sharpness alluded to as existing in the print was due to a little irregularity in the motion of the clock, a defect which has now been completely rectified.

Should sufficient interest be felt in this subject, I shall be happy, on a future occasion, to give a detailed description of the automatic solar camera, as well as an account of my working with it. At present I can only say that a piece of carbon tissue was pinned up to the focussing board, and, after an exposure of about half an hour, was developed and finished in the usual way.

As a matter of course, the enlargement can be made by any other method which is found to give good results, though I do not imagine that as good a result is likely to be got by making an intermediate transparency. The solar camera method has the advantage of being a direct enlargement. Most now present know that while it is easy to make on glass a large satisfactory transparency from a small negative, it is most difficult to produce a correspondingly successful enlarged negative.

This, however, by the way. We come now to the important question of illumination. Except for the smallest degree of amplification, I have not been successful with anything but sunlight. This is a matter of great regret, because micro-photography is just such an occupation as one would like to follow on winter days or evenings when there is most spare time on hand.

Paradoxical as it may sound, better enlargements can be made of objects from an inch in diameter down to half-an-inch, without a microscope at all, than with one. Nothing more is needed than a good magic lantern, preferably fitted with lime or electric light. Care must be taken that the condensers are good ones. For the amplifying lens a small portrait combination, stereoscopic size, or smaller, will answer best. It must be a lens giving a flat field, and must have no central stops. The microscopic slide, fitted into a frame, is pushed into the lantern in the ordinary way, the light adjusted as usual, particular care being taken to obtain a perfectly equally-illuminated disc

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* Read before the Photographic Society of Great Britain.

The focussing will require the closest attention, and is better done on a piece of cardboard than on the ground glass of the camera. Objects must be chosen that are moderately transparent, and not of a non-actinic colour, as most entomological preparations are. If there is much opacity, the concentrated lime-light will not be found sufficiently powerful. With properly-selected specimens the exposures will be very short. Some otherwise intractable subjects can be managed by masking portions during the exposure. But when we come to really minute objects, and comparatively high powers are needed, the sun alone can produce a successful negative. In most cases the exposures are very rapid.

(To be continued.)

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ON A PROCESS FOR THE ELECTRICAL DEPOSITION OF METALS, AND FOR CONSTRUCTING METAL-COVERED GLASS SPECULA.

BY PROF. ARTHUR W. WRIGHT, YALE COLLEGE.*

ONE result of the investigation has been to show that the colour of the light which has passed through a layer of metal varies somewhat with the thickness of the film. This was known to be the case with gold, and experiment has shown it to be true of platinum and bismuth also. Thus, the latter in a very thin film appears a clear bluish-grey, while a much thicker film appears brownish. Platinum, in a thin layer, has a greyish tint, which varies, as the film is made thicker, to a peculiar brownish shade, somewhat like that of sepia, passing into brownish yellow, and finally becoming a deep yellow, even inclining somewhat to orange in the thickest films obtained. Now, this colour is almost exactly complementary to that transmitted by silver, and the possibility suggested itself of making a mirror which should be perfectly white by reflected light, by depositing first a thin stratum of silver, and over this another of platinum, the relative thickness of the two being properly regulated by observing the colour of the transmitted light. An experiment made with a circular disc of flat glass was perfectly successful, the platinum being readily deposited upon the silver, the yellowish tint of which it entirely removed, producing a white and brilliant reflecting surface. By transmitted light the film, as it was anticipated would be the case, has a pure neutral tint, with no perceptible colour of any kind.

The value of such a combination for specula is evident, for though, until careful measurements are made, it cannot be asserted that the absolute reflecting power is increased, the whiteness of the layer, and the protection afforded by having the surface covered with an unalterable metal, are very substantial advantages. In constructing large mirrors it will probably also be found to result in a material saving of time, the silver being so much more rapidly and easily deposited than the platinum. The process can also be used with great advantage for the construction of solar eyepieces for telescopes, since the compound film can be deposited directly upon the surface of the lens, and made thick enough to reduce the intensity of the light as much as may be desired. An image nearly or quite colourless could thus be obtained, and the disturbance of the rays should be less than that produced by the interposition of a dark glass of the ordinary kind.

As has been mentioned, some experiments were made with bismuth, and a mirror of excellent surface was obtained, but the metal is inferior to platinum in brilliancy, and has a decided colour. The great facility with which films are obtained with it might recommend its use for mirrors in some cases, but for most purposes other metals are to be preferred. Attempts to produce mirrors of iron and nickel were but partially successful, as it was difficult to prevent tarnishing by oxidation. Some good iron films were obtained, however, which were very brilliant. They were exceedingly hard, and adhered to the glass with such tenacity that at first it seemed as if they had been fused into it. But when the film was dissolved off by an acid the glass was found not to have been acted upon at all. A singular characteristic of the iron in this condition is its chemical inertness. Films prepared more than six months ago and freely exposed to the air, which, for a part of the time, too, was excessively charged with moisture, have not shown the least alteration. Nitric acid placed upon one of them for a short time produced scarcely any effect, and nitro-hydrochloric acid acted upon it with about the same readiness as it does upon platinum. This may be due to the extreme thinness of the film, in consequence of which even the exterior atoms of the iron, being within the range of the molecular action of the glass, are held by a force tending to oppose and neutralise the attraction of reagents that ordinarily attack the metal energetically.

It is not at all necessary that the object upon which the metal is deposited should be of non-conducting material. This is shown by the fact that the process continues to go on after the glass has become covered with a perfectly continuous layer of metal of considerable thickness. The success of the experiment of covering a silvered glass with platinum is additional evidence of the same fact. In order more fully to test the question whether a deposit could be made upon a solid piece of metal, a small silver coin was placed in the pan under an electrode of gold. It was covered in a few minutes with a beautiful coating of the latter metal, which was found to be very hard and to adhere perfectly, having also, in every respect, its proper colour and lustre. At the beginning of the process, while still thin enough to allow light reflected from the silver to pass, it had a greenish colour, producing a curious effect.

As an example of the applicability of the process to practical purposes, it may be of interest to mention the results of some experiments in the construction of a small Gregorian telescope, the specula of which were covered with platinum by the method described, and with entire success. The larger mirror has a diameter of a little less than four centimetres, and both this and the smaller one, so far as the nature of the surface is concerned, appear absolutely faultless. As only common lenses were employed in its construction the performance of the instrument is not remarkable, but it is sufficiently good to warrant the assurance that the method will be serviceable for the production of specula of exquisite quality for optical purposes. The size of the apparatus, which, for convenience in experimenting, was necessarily small, did not permit the introduction of larger mirrors than this, but there seems to be no reason for doubting that much larger specula can be successfully made in this way. The amount of time required for obtaining the platinum covering of this mirror was about three hours, during which the coil was kept in continuous action, with a battery power equivalent to four or five small Grove cells. Mirrors of larger size would of course require a longer time, but with suitable apparatus a much stronger battery and larger coil could be used, which would materially accelerate the operation. A plate two centimetres in diameter can be covered with platinum in twenty or thirty minutes sufficiently thick to form a good speculum. For gold or silver the time would not be more than from ten to fifteen minutes.

Many useful applications of this process may be found, and its use is not limited to those metals which have been mentioned here. Moreover, for many of them no other available process is known by which they can be deposited in a uniform layer and with a brilliant reflecting surface upon glass. A very thin layer of platinum, or still better of silver and platinum together, could be used with great advantage in the *camera lucida* and similar instruments. Very perfect mirrors for galvanometer needles, and for delicate torsion apparatus, can be expeditiously formed in this way, and by the use of very thin glass, or the most delicate films of mica, they may be made of almost inappreciable weight. For the mirrors of heliostats, and other reflecting instruments in which a metallic surface is necessary, the specula produced by this method will be especially valuable. For telescopes, the beautiful process of Liebig and Foucault for forming silvered glass specula, is recommended by the ease with which it is applied, and the rapidity of its operation. But the perishable nature of the delicate silver film, and the difficulty of securing a firm and permanent adherence, are serious disadvantages. These are entirely avoided by the use of an unalterable metal like platinum; and though for instruments of the largest size the process here described may be found impracticable, for those of more moderate dimensions there is every reason for believing it may be employed with complete success.

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* Continued from page 17.

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THE PROGRESSIVE RESULTS OF THE PAST SESSION.

BY DR. JOHN NICOL.*

YEAR by year a paper on the progressive results of the past session is becoming more and more difficult to write; perhaps I ought to say it is becoming more and more easily written, as most certainly there is year by year less progress to record.

If it be true that charity ought to begin at home, it is equally true that any local progress that may have been made should be first noticed; and, therefore, I commence by reminding the members of the great measure of success that attended the exhibition held under the auspices of the Society twelve months ago. This, I think, we are fairly entitled to include under the items of progress, as many attempts at photographic exhibitions had previously been made in Edinburgh, but in no case had they been pecuniarily successful, or attained to anything approaching the magnitude or technical excellence of that of last year. As, however, I hope shortly to bring the history of the recent exhibition before the Society in another and more satisfactory form, I shall leave it for the present, and pass to other, though, probably, less important, items of progress.

Those who think, with me, that perfection in photographic manipulations is to be looked for in an emulsion process, in which the bath, with all its troubles, is discarded, will recognize the contributions of Mr. Gray as of considerable importance in that direction. It is no doubt true that, for commercial reasons, Mr. Gray keeps his process a secret; but we have abundant evidence that by it dry plates may be made much more sensitive than the ordinary wet collodion film, and that the image may be developed to full printing density without any tendency to fogging, although no bromide or other restraining agent is employed. But although the process is kept secret, I am at liberty to say that the principle involved is the use of an organic body which, by enveloping large excess of free silver, enables its accelerating influence to be brought into play without the ordinary drawbacks of fogging, or the production of thin images.

Next in importance, perhaps, is the method of washing the emulsions by precipitation, introduced, in the case of collodion, by Mr. W. B. Bolton; and of gelatine, by Mr. Wratten. By this means the operation is shortened and simplified, and as washed emulsion is the direction in which perfection is to be looked for, this improvement is undoubtedly a step in the right direction. Taking the emulsion process as a whole, although (except in the points already indicated) no very marked improvements have been made, there has been considerable light throw on some of its more obscure phases, and the united results of many ardent experimenters have swept away many difficulties, and shown how some of its most objectionable qualities may be got rid of.

Carbon or pigment printing has, as usual, continued to make rapid progress, not so much in the direction of any new improvement, as in the overcoming of prejudice and the increase in the number of those practising it; and I think it is matter for congratulation that we have now in Scotland two houses which turn out for the trade work of the highest class: I mean Messrs. J. W. Wilson and Co., of Aberdeen; and Mr. Annan, of Glasgow. In this connection, Mr. Johnston, whose name has been long connected with carbon printing, has patented some improvements, the principle of which is the getting of tissue the colouring matter of which varies, being denser or in larger particles at the bottom, and smaller towards the surface. Whether this is an improvement remains to be seen; but doubtless such tissue will soon be in the market, and carbon printers will not be slow to avail themselves of it should it be all that is claimed for it.

In addition to substantial improvements, there have, as usual, been claims advanced for some things that, to say the least, are of doubtful value.

Foremost amongst those is the barefaced attempt of M. Scotellari to extract the needful from the pockets of phographers for his patent "Opturateur Sensible," and I can only hope that Scotchmen, at least, will be too sensible to take the bait, as even fifteen shillings is too much to pay for a cardboard cap with a hole covered with a bit of violet-coloured paper.

Mr. Vanderweyde is one of those clever, restless people who are never content with things as they are, but must always be trying to improve them. His last venture may probably turn out to be his best. Be that as it may, he has undoubtedly shown how portrait work may be carried on with artificial light. By the electric light he brilliantly illuminates the interior of a white painted box, and pours the rays through an annular lens, such as is now used in lighthouses; and under such a light very fine portraits are said to have been produced in a few seconds. I hope by next meeting to have some specimens for exhibition, and members may then judge for themselves as to the quality.

In connection with this matter, I would throw out a hint, which, if acted on, may be of advantage to all concerned. It is generally admitted that at present photography as a trade is very dull, and that a novelty of some kind is wanted to give it an impetus. Such a novelty may be either one that from its popularity and cheapness would attract sitters to the studios throughout the country, or something that would revive the interest in photography by making it for a time, at least, the general subject of conversation. To the latter class the successful introduction of photography by night would certainly belong, and, if properly wrought, could not fail to largely increase the ordinary business. The cost, however, of fitting up the necessary plant—involving, as it does, a powerful electro-magnetic machine and suitable gas or steam-engine—is too great to be undertaken by a single individual, and as the benefit is likely to be felt by all, it should be a joint-stock concern. I would suggest that the principal photographers in the city join together in securing a suitable suite of rooms in a central position, and fit up a studio with all the necessary appliances for the proper carrying out of Vanderweyde's system of night working. If properly advertised, the novelty would produce an amount of enthusiasm that could not fail to largely increase the ordinary trade, which, *par se*, would yield a handsome profit, which, of course, would be divided amongst the shareholders.

On the whole, although nothing very striking has occurred during 1877, photography has not only kept its ground, but made considerable progress, especially in the artistic direction. Retouching, the bane of the profession in some previous years, is gradually giving place to the production of negatives so perfect as to need no such aid, the result being truer and better work, which, probably, after all, is the direction in which we must look for the permanent improvement of the trade.

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* Read before the Edinburgh Photographic Society.

The Photographic News.

Vol. XXII. No. 1011.—JANUARY 18, 1878.

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DEEP PRINTING AND PERMANENCY.

An able letter on another page, dealing with a number of important questions in connection with portraiture, commences with the query—"Do photographers print deeper than formerly?" And the writer himself answers in the negative. He thinks they do not. We have no hesitation in saying that they do not. In point of fact, we think that, on the contrary, they print much less deeply than was customary in the early days of collodion portraiture, and we think that to this, in some degree, is due the fading of silver prints, more frequent of recent years than formerly. A first glance at a modern photographic exhibition, or at an album of recent portraits, might suggest that deeper printing prevailed; but a more careful examination would show (as our correspondent points out) that a greater prevalence of sombre hues, and a much more general introduction of masses of shadow into pictures, accurately explains the appearance of deeper printing. When the crowning praise of a negative, that it was "as black as your hat, sir!" prevailed, white faces and chalky linen were common, and very deep printing indeed was necessary to get the slightest appearance of drawing into the pictures, owing to the extreme density of the negatives. But in the deepest-printed pictures there were still generally bald masses of white. Photographic portraitists have acquired some artistic culture since that time, and a recognition of the fact that the texture of flesh is not fairly represented by that of chalk; the tendency in the present is, on the other hand, to produce faces full of half-tone and texture, but almost too deep in tint. We remember, something like ten years ago, being in Mons. Adam-Salomon's studio when an English gentleman and lady were sitting, and the lady shewod a portrait which she stated had been produced in one of the first studios in London. It was not quite satisfactory, and she was anxious that the French artist should point out its faults, a task which he by no means relished. After some pressing, he remarked that the colour and texture of the face were in nature very different from the colour and texture of the gentleman's linen, whilst in the picture they were rendered precisely alike. This defect, common in the old time, is now rarely met with. The negatives used to be so dense that the face was little more than a bald patch of white, and to the deep printing necessary with such negatives, we think, was due the greater permanency of silver prints. We think that it is not improbable that theoretical reasons could be stated why this should be so; but we are dealing with results of observation of many facts, rather than theoretical considerations. Dark printing secures, of course, a deep reduction of silver, and thus in the substitution process of toning permits of a good deposit of gold, which is the especial source of permanency. We have recently had opportunity of examining a number of prints, taken about twenty years ago, some of the earliest treated by the alkaline gold toning bath, and we were surprised at the brilliancy and purity of their colours; some especially, which were toned to a rich, deep engraving-like black tone, were as perfect as they were on the day they were finished. Those which had changed were invariably the lightly-printed copies from the negatives toned to a brown colour. We have not unfrequently heard from old photographers the opinion expressed that the old hypo-toned prints were more permanent than the modern gold-toned prints, and various examples were mentioned in confirmation of this opinion. Such examples were not lacking within our own knowledge and experience. But we are strongly disposed to attribute the fact to the depth of printing rather than the character of the toning bath. In the days of pyrogallic acid development, extreme density was a virtue of the first magnitude in a negative, whilst of late years thin negatives have been in favour. The old dense negatives sometimes required a day or two of roasting exposure to secure a good print, the shadows being deeply bronzed before the lights were printed through, and such prints are generally found to have been very stable, and remain with but slight change after many years have passed.

To those who advocate and practise silver printing thist hint may be especially useful, and we commend the subjec to their attention. Without aiming to secure the density of former days in negatives, let them be sufficiently brilliant and intense to permit of deep printing and bronzing in the shadows without destroying the lights. Such prints will, we are persuaded, be found much more permanent than the lightly-printed proofs which will not tone to a deeper colour than brown or grey.

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THE PHOTOGRAPHIC SOCIETY OF BERLIN.

We need say nothing in regard to the letter we append addressed to the Editor of this journal, beyond remarking that it will probably interest our readers. We need scarcely add that the courtesy and honour was gratefully accepted.

"Photographischer Verein zu Berlin.

"*Berlin, December 29th*, 1877.

"Mr. G. Wharton Simpson, M.A., F.S.A., London.

"Dear Sir,—The great services you have already rendered to the photographic art during the long years you have been in connection with it have induced the committee of our society to propose, as a sign of our high consideration, your election to the Photographischer Verein zu Berlin, as a

"Honorary Member,

And this proposition has unanimously been accepted.

"You will therefore kindly inform me, dear sir, whether you accept the title of honour, whereupon we shall send you the diploma.—Believe me, sir, yours very truly,

"Ernest Duby, Secretary."

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FRENCH CORRESPONDENCE.

Death of Adolphe Braun, of Dornach: His First Appearance as a Photographer and as a Pioneer in Carbon Printing—The Keeping Qualities of Chardon Emulsion—A Substitute for Gum Arabic—The Annual of the Bureau des Longitudes—Janssen's Solar Photographs: How they are Taken.

A sad bit of news was announced at the opening of the sitting of the French Photographic Society at their last meeting on January 4th; it was to the effect that M. Braun, of Dornach, had died. There are few photographers who enjoyed so wide a reputation as that of M. Adolphe Braun, which he had acquired by his indefatigable activity, by the superiority of his artistic talents, and by his great skill in all photographic manipulations. A skilful draughtsman, M. Braun made his way first of all in fabric printing, and made his début in the photographic world about 1854. His first works were exhibited in the exhibition of Paris of 1855, where they obtained universal approbation. They consisted, it may be remembered, of a large collection of flowers of all kinds, in bouquets and garlands and crowns, admirably photographed, and of the size of nature. The eminently artistic arrangement of these pictures, their large dimensions, and the masterly manner in which various difficulties had been overcome, all combined to attract the attention of visitors. M. Braun, in acknowledgment of his talent, was nominated to the Ligion of Honour.

Very soon he was heard of again in quite a different direction. Some stereoscopic views which he produced achieved his reputation; then came those beautiful reproductions of his undertaken in all the principal museums and galleries of Europe, and which were rendered inestimably more valuable by the circumstance that they were printed in carbon, a process which M. Braun was one of the first to adopt.

The establishment which M. Braun founded at Dornach was a veritable photographic factory, where everything was carried on on a large scale. Besides this, he had a large house at Paris at the establishment of M. Pierson (whose son became M. Braun's son-in-law and partner) and an extensive shop not far from the New Opera. M. Braun occupied, therefore, a double position in the photographic world as an artist and man of business. His high position was due to his own exertions, and his loss will be sadly felt by all of us.

The Commission appointed by the French Photographic Society to enquire into the merits of M. Chardon rendered an account last Friday, through M. Davanne, of some interesting experiments which have been undertaken by that body. Some samples of dry emulsion, some bottles of dissolved emulsion, and some prepared plates were confided to the care of two officers of the French navy ordered to Shanghai and the far East. On return—or, in other words, after the double voyage to and fro across the seas, and having passed through extreme temperatures—it was found that the dry emulsion kept in the closely stoppered bottles, and screened from light and damp, had not undergone any alteration. The wet emulsion was found to have become considerably weaker. The prepared plates, transported in cardboard boxes, were much changed, while some placed in ordinary boxes had endured the voyages very well indeed. These results may prove of service to all those who make use of the Chardon process.

At the same meeting M. Carette exhibited to the members of the Society a product—new, at anyrate, so far as France is concerned—and which is destined to replace gum in the retouching of negatives. The name of this substance is *Tchaoma*; it has, I am assured, none of the inconveniences of ordinary gum, since it is not hygroscopic, and does not turn bad; moreover, it dissolves much more readily. It may be spread upon a cliché either at once after washing, or when the negative has become dry. It is about the same price as gum—that is, one franc twenty-five cents. (one shilling) for a litre of the liquid. I cannot help thinking, with M. Carette, that the material with the strange name is destined to render good services to photographers.

The annual published by the *Bureau des Longitudes* for this year contains a long and interesting notice by M. Janssen upon the solar photosphere, and upon photography as a means of discovery in Physico-Astronomy. In this memoir the eminent astronomer tells us that, according to his experience, the photographic image of the sun is capable of revealing phenomena which are not perceptible to the eye, aided even by the perfect instruments that we possess for astronomical observations. M. Janssen has proved his dictum by executing the photographs of which we have already spoken, and which permit one to study the surface of the sun with consummate ease.

The learned astronomer makes known, in the article to which we refer, and to which I would especially call the attention of my readers, all the means and methods, optical and chemical, that he has employed to secure the wonderful pictures I have referred to, and which leave nothing to be desired. Not only this, but M. Janssen contributes also, in illustration of his work, a photograph of the sun, manifesting the delicacy with which these images are now obtainable. It is a picture of a fragment of the solar surface, and has been produced by enlarging to three diameters the original image, which measured 30½ centimetres in diameter. The exposure necessary to secure pictures of this kind varies from $\frac{1}{2000}$ to $\frac{1}{3000}$ of a second. The development is conducted very slowly, as may be imagined; it is commenced with iron, and continued with pyrogallic acid containing silver.

The picture in the annual of the *Bureau des Longitudes* is a photo-mechanical print, a Woodburytype having been secured from the enlarged negative. The publication, therefore, marks on the present occasion an important epoch in science, and is a glorious event in the annals of photography.

Ernest Lacan.

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A SIMPLE AND GOOD VARNISH.

BY NELSON K. CHERRILL.

Take three-quarters of a pound of gum sandarach, and two ounces of gum shellac (the brown I used), and place them in a bottle, and cover them with very strong alcohol. Stir up frequently, and keep in a warm place; in about two days pour off the liquor into a Winchester bottle, and put again some more strong alcohol; let it digest two or three days longer, stirring often, and keeping the bottle in a warm place. This will dissolve all the residue. Add the liquor to that already in the Winchester, pour in an ounce of castor oil, and shake it well up. Now dilute the whole with common methylated spirit till the Winchester is full, and, after fining, which will happen in a week by itself, you will have as good a sample of varnish as anyone need want.

The point in this preparation is that the pure alcohol, being used as a solvent, only seems to take up all the good properties of the gums, and when the dilution comes, all the gum is still held in solution; whereas, in my hands at least, any attempt to dissolve the gums direct in the methylated spirit is a failure, as far as the quality of the varnish is concerned.

This varnish will dry half bright, and will take the pencil very readily, if it be wanted to add to the tooth. The surface will rub with perfect ease by the finger being just touched with powdered pumice, or resin, &c.

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THEORY OF THE DESTRUCTION OF THE UNDEVELOPED PHOTOGRAPHIC IMAGE.

BY. CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

If I may be given permission, I will read a letter from myself, addressed to the journal of the Society, as it was also to the other photographic periodicals, in which certain important additions were made to the paper I had the honour to read at our last meeting. I wish to obtain this permission, as I think that any matter which bears upon photography should, if possible, be brought before the members, that they may have an opportunity to discuss it; and also, that the author or discoverer, whichever the case may be, may have an opportunity of explaining any difficulty which may seem to others to require it. I am particularly anxious to hear any remarks that may be offered on this subject, as it seems to me that it affects the theories held in certain particulars.

[The letter appeared in the News, page 614 of our last volume.]

As an addendum to the above letter, I should like to make a few remarks. Firstly, the action of ozone is not confined to the destruction of the invisible photographic image alone;

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* Read before the Photographic Society of Great Britain.

but it is also remarkably distinct in photographic prints I have here a specimen of its action. The end of this toned silver print was kept dry, the middle portion *slightly* damped, and the other end saturated with water. I would have you specially remark the result. The damped portion is very much faded; the wet portion shows a decided loss; whilst the dry print is almost unaffected. Now, we know that moistened silver is per-oxidised by ozone, but from what I can see by having tested a portion of it, we have a distinct change, not in the metallic silver alone, but in the organic compound of silver forming the image. Now the print was as well washed as most prints are, and you will notice that in one spot, where a drop of sodium hyposulphite has been placed on the paper, we have a marked effect on the image, even where it was wet. I am not in a position at present to say definitely what has happened in the compound forming the image, but this I can say, that what will happen in ozone will generally happen by exposure to the atmosphere. In our climate, where we are exposed to so much damp, the very best state apparently for destroying the silver image is to be found.

My friend, Mr. Pearsall, in a conversation I had with him the other day, incidentally mentioned that in an old experiment made by Sir W. Grove, he found that the electric spark, when allowed to pass over the surface of a sensitive plate, did not cause any developable image where the spark had passed, that remaining a blank, but outside it developed. Mr. Pearsall was unaware of the experiments I was at that time carrying on, and it immediately struck me that the strongly ozonized air, which would be in contact with the plate when the spark passed, would prevent the formation of an image, whilst beyond that space the light from the spark would be free to act. I may say that this oxidising action of ozone on the undeveloped photographic image opens out a great field of enquiry into coloured spectra, photography of the least refrangible end of the spectrum, and the reversal of the action of actinic light by the red rays. I also may say that in my succeeding researches on these points I have met with encouragement to proceed; and at some future date hope to lay the results before the Society.

[We add the full report of discussion from the official journal.]

Mr. Pearsall observed that, in the Society's rooms, some years ago, after speaking of the Philosophy of Photography, Sir William Grove referred to several experiments, which he thought had not been sufficiently followed out, and recently he (Mr. Pearsall) had, at the request of Sir W. Grove, searched for the records of these experiments for this purpose. In these experiments Sir W. Grove had taken a sheet of glass, on which he placed, in letters of tinfoil, the word "Volta." He then passed the electric spark through the word, thinking to get some particular effect from the discharge. Greatly to his surprise, when he removed the tinfoil there was no development where the letters had been, but a development in every part of the glass not covered by the tinfoil, the pictures on which the latter had been placed being clear, while the remainder was cloudy. Sir W. Grove thought that these experiments might be pursued with advantage, and for this purpose he (Mr. Pearsall) had mentioned the fact to Captain Abney as a thing which ought not to be allowed to stand alone, and the result of Captain Abney's further researches they had had that night.

Mr. Sebastian Davis said that he wished to make an observation in reference to a fact which, in his opinion, seemed somewhat to militate against the theory of fading which had been advanced that evening. He referred to the action of tannin, or tannic acid, and gallic acid upon sensitive plates. It was well known to photographers in the days when tannin was much used as a preservative, that the plates, when washed with the usual ten or fifteen grain solntion, had to be developed very soon after exposure, as they soon deteriorated, although the time between preparation and exposure might be considerably extended without any bad effect following. But it was also noticed that the contrary was the case when a wash of gallic acid was applied, and plates so prepared could be kept for a lengthened period between exposure and development. He (Mr. Davis) had brought this before the photographic world many years ago, and that it was true had been established, beyond a doubt, by a great many experiments. Indeed, there was no chemical agent which had a greater power in regard to the preservation of the image than gallic acid. But instead of its being an oxidising agent, it was a reducing agent, and he (Mr. Davis) thought it would be well if some explanation could be given of this apparent contradiction, why gallic acid, a reducing agent, was capable of preserving the image on the photographic plate for an indefinite time.

Captain Abney observed that the end of the letter would furnish an answer to Mr. Davis's objection.

"Is it not probable that the keeping qualities of certain plates, when washed over with gallic acid, may be due to an oxygen absorber being present, which the atmosphere must first saturate before it can hope to attack the silver image? Apparently a preservative for a dry plate should be impervious to the air, and for double security it may be presumed it should contain some substance more readily oxidised than the atoms forming the image."

The fact was he had tried both tannin and gallic acid. Tannic acid had certainly not the same effect as gallic and pyrogallic acid. Gallic acid, when flowed over an exposed plate, preserved the image from the action of ozone. Sugar of milk also preserved the image, but he did not attribute the effect in this case to the same cause. Oxygen absorbers preserved the image from fading, but he was not inclined to agree that tannin was an oxygen absorber.

Mr. Davis.—I should rather term it a reducing agent.

Mr. Spiller remarked that the subject was one upon which he had had a little discussion with Captain Abney. He was rather inclined to agree with Mr. Davis, and use the term "reducing agent;" at all events, in the sense in which he applied it, rather than "Oxygen absorber." A reducing agent was not necessarily an oxygen absorber, since it might have an affinity for chlorine.

Captain Abney.—In the case of a bromide film, gallic acid is *not* a reducing agent at all.

Mr. Davis.—That is scarcely borne out by experiment. A plate can be developed by gallic acid, though I admit its action is very weak, and not nearly equal to pyrogallic acid.

Captain Abney.—I fancy we are rather at cross purposes as to what we actually do mean. Pure bromide of silver exposed to light and treated with gallic acid for months, whether in vacuo or not, certainly does not show the slightest reduction.

Mr. Spiller.—And still it is an oxygen absorber.

Captain Abney.—Yes, but it must not be regarded as a reducing agent in the presence of pure iodide or bromide of silver. If you introduce silver nitrate you get a different state of affairs altogether.

Mr. Spiller.—That is so, in this case then gallic acid is not a reducing agent.

COMBINATION PRINTING FOR THE STEREOSCOPE.

BY S. H. ASHLEY OAKES.*

Part I.

The subject of which I am about to speak to you to-night is the one nearest to my heart, so far as photography is concerned. I am but an amateur, so I come before you with all due deference as far as my opinions are concerned. I feel how unworthily I have performed the task I set myself in writing this paper—a task I looked forward to with some pleasure and no little anxiety, for my object in doing this is a very ambitious one—no less, indeed, than a hearty desire on my part to awaken in the photographic world, and through them the world outside, a frest interest in one branch of your business that you have sadly neglected, and a branch that, not only in my opinion, but in the opinion of many others, deserves a better fate at your hands. I cannot reasonably hope to accomplish this to-night, or even in many nights, but I am satisfied that the stone only requires to be set rolling down the hill and it will accomplish its own end.

I see by the announcement that I am down for a paper on "Transparencies." As this may be somewhat misleading, I must first of all inform you that I am about to tell you what I know of stereoscopic transparencies, and more especially about Mr. Breese's work in this direction. I trust I shall not tire you by constant reference to this gentleman's name; but I look upon myself as occupying the same position with regard to him as Boswell to Johnson, and I look upon Mr. Breese as occupying the same position as a photographer as Johnson did in literature, and if I can only be of as much service to his memory I shall be satisfied. Boswell, you know, was abused wholesale as a bore and a toady; but he bored and todied to some purpose, for, thanks to him, we have one of the finest biographies that has ever been written.

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* Read before the Manchester Photographic Society.

At the risk of taking up a portion of the short time at my disposal this evening in telling you what most of you know, or should know already, I propose to run over, as briskly as I can, a short description of the instrument I am about to deal with. In doing this, I shall not mind making use of the language of others where I believe they have expressed themselves better than I could do. I have little scruple in going into details that may appear at first sight unnecessary; but I have found that most people, though rejecting with scorn the idea of their ignorance of the principle of the stereoscope, really know very little about the matter when asked to explain the principle in question—people, too, tolerably well informed on scientific matters generally.

When we look at an object a picture of that object is formed on the retina of each eye; but each picture, being observed from a different angle of view, differs to a slight extent, and the nearer the object is to the observer the more marked the difference is. If the right hand be held at right angles to the face, and a few inches from the nose, the back of the hand will be seen by the right eye only, and the palm of the hand, when viewed by the left eye, if you close each eye alternately. Hence the images formed on the retina of the two eyes must differ—the one including more of the right-hand side, and the other more of the left-hand side of the same solid or projecting object.

Perfect vision and perfect representation of solid objects in monochrome cannot be obtained without two eyes and without two pictures taken at a suitable angle of view; and it is by the combined effect of the images produced in the retina of each eye, and the different angles under which objects are observed, that a judgment is formed respecting their solidity and distances. You will observe that I am talking of pictures in "monochrome," because the artist proper has special advantages in representing objects with regard to solidity and distance in the use of "colour," apart from light and shade, or, rather, in addition to light and shade.

It is well known that blind men who have been restored to sight cannot tell the form of a body without touching it until their judgment is matured by experience, although a perfect picture may be formed on the retina of each eye. A man having only one eye cannot readily distinguish the form of a body which he has never previously seen; but he quickly and unwittingly moves his head from side to side so that his one eye may alternately occupy the different positions of a right and left eye. It is, in fact, quite an amusing joke to request a friend to take the snuffers and snuff the candle with one eye closed. He is bound, in the ordinary course of things, to make several bad shots before he succeeds in trimming the wick.

It may be asked—"If the use of two eyes is so valuable in judging of distances, why do people who are taking aim with a gun invariably close one eye?" But, in this case, the gun being placed against the right-hand shoulder, and the barrel being so immediately in a line with the eye with which aim is being taken, the effect of opening the other eye would be to throw the end of the gun at least a yard to the right hand apparently. If you are not satisfied that this is the case it is almost worth your while to try by holding up the finger as if you were taking aim, then closing the left eye, as you would naturally do, make a careful observation of the spot covered by the end of your finger. Then suddenly open the left eye and close the right one, and mark the apparent difference in the position of the end of your finger. Another instructive experiment is to look at an object and then press one of the eyeballs slightly, thereby diminishing or increasing, as the case may be, the angle of view, and the result is you get the object in duplicate.

Drunken men are said to "see double," because they have not the sense or sufficient-command of themselves mentally to concentrate their sight or mind on one object. The consequence is they see the same object in the retina of each eye, and, the mind not working in unison or sympathy with the eyes, they see two objects for every one they look at; and the distance between the object seen with one eye and that with the other would probably be the distance between the observer's eyes, or about two and a-half inches. In playing billiards this must be very awkward, for the drunken player would see two tables, two cues, six balls, and twelve pockets.

In order, then, to deceive the judgment so that flat surfaces may represent solid or projecting figures, we must cause the different images of a body as observed by the two eyes to be depicted on their respective retinæ, and yet to appear to have emanated from the same object. Two pictures are, therefore, taken from the really projecting or solid body—the one as observed by the right eye only, and the other as seen by the left. The picture is then placed in the stereoscope, which is furnished with lenses so constructed that the rays proceeding from the respective pictures to the eyes should be refracted at such an angle as each set of rays would have formed had they proceeded from a single picture, occupying the centre of the instrument to the respective eyes without the intervention of lenses. No human hand could draw or paint sufficiently accurately to produce any but geometrical figures for the instrument, and photography kindly steps in and does the work for us.

In former days the pictures taken for the stereoscope were Daguerrotypes; and, by the way, let me remark that next to a glass transparency I have reason to believe the Daguerreotype is the process most suited to the purpose. I sincerely wish I could induce some one present to try a few of these pictures for the stereoscope of still life, such as dead game, flowers, or fruit, by way of an experiment. I am sure it would repay him for his trouble if they were only done for private use. I regret I have neither the time nor the money to experiment, as I long to do at times. The advantage of the Daguerreotype over paper slides in the stereoscope are many. Paper is simply abominable to any one who knows and can appreciate the tenderness and delicacy of a well-toned transparency. (You must not think I am abusing paper photographs wholesale; but, bear in mind, I am speaking only of paper used in making slides for the stereoscope to be viewed either by reflected or transmitted light.) No paper has yet been made that will stand the test of the stereoscope. Who ever saw a sunlit cloud properly represented on paper, with every bit of detail from the highest light to the deepest shadow? Who ever saw water represented on a paper photograph that would bear the slightest comparison to water in a transparency? Or who ever saw anything on paper that gave one the feeling that atmosphere existed between the foreground and distance? You may see a fuzziness, but fuzziness is not atmosphere.

(To be continued.)

"SPIRIT PHOTOGRAPHS" AGAIN.*

A "TEST SEANCE" IN A SCEPTIC'S GALLERY IN BROOKLYN.

A *World* reporter called upon Mr. Henry J. Newton, president of the Photographic Section of the American Institute, to learn his opinion of some "spirit photographs" recently taken in Ketchell's gallery, Brooklyn. Mr. Newton said: "Mr. Ketchell had made a challenge to any one to successfully obtain spirit photographs in his gallery under fair conditions. Mr. Jay J. Hartman, formerly from Cincinnati, accepted the challenge. I was invited to be present; two other photographers and a lady and gentleman were also there. Mr. Ketchell washed the plates, sensitized them, and personally supervised all the preliminary operations in the dark room. Then Mr. Hartman took the holder containing the plate, placed it in the camera, which, though it was Hartman's, had been carefully examined to prevent fraud, and removed and replaced the cloth over the aperture. The first experiment resulted in nothing. In the second, surrounding the figure of the sitter (Mr. Fred. Haslam, of Brooklyn), were six forms, some of adults and some of children, apparently clothed with a peculiar white drapery. I then sat, the resulting negative showing the form of a lady unknown to me."

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* *New York World.*

Here Mr. Newton produced the negatives and proofs of each. He said that similar negatives might be produced by several mechanical processes, but these two he believed to be the genuine. "I have made negatives," Mr. Newton continued, "and have seen others made, where the effects have been produced by anything but spirits." He then brought out two such, and pointed out the difference between the spurious and the genuine.

"Mr. Ketchell professed to be satisfied, and signed a certificate to that effect; the photographers present, sceptics, also expressed great astonishment, and admitted that they could not by any contrivances produce the like. Next week Mr. Hartman has promised to experiment in my house, when I mean to have scientific gentlemen present who will conduct every operation under test conditions."

In the Hartman negatives the outlines about the heads and shoulders were perfectly distinct, the drapery fading away gradually, so that one cannot tell where it ceases.

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Correspondence.

CONCERNING PORTRAITURE.

Sir,—Do photographers print deeper than formerly? I think they do not! The question should be: Do they produce darker pictures than formerly? Certainly they do; but the dark aspect is not solely attributable to the depth of printing, but to many reasons, which I will endeavour to explain. 1st. Retouching has enabled us to make our negatives thinner and more delicate, thus they print darker, being more transparent. 2nd. Our sitters themselves, thinking to avoid the errors which they committed in their last picture—or some friends they have seen—which pictures were taken in the days of photography when a white dress was depicted as a white dress in every sense of the word, almost whiter than the paper on which this is written, and possessing about as much light and shade over its area: with the recollection of this patchy picture fresh in their memory, they attire themselves in a dark dress, dark ribbon, dark jewellery, dark everything; nothing white takes well in photography—that is the idea; thus dark, sombre, funeral-like pictures are the result, not smiling with the faintest gleam of light and attraction to the eye. 3rd. Very little style or artistic taste was used in the posing. Formerly every sitter was posed in such a position that to move was almost an impossibility, the figure being stood equally poised on both feet, head and figure all in one direction, propped up with the everlasting pedestal in addition to the head-rest, totally devoid of all grace and action or the slightest appearance of life—in fact, as much style and life evinced in the pose as in a tailor's dummy.

You might expose for three minutes, and all was perfectly rigid, no more; whereas now, when style and action, life in the figure, apparent movement in the space around the figure, "with the very life warm upon the lip, the fixture of the eye has motion in it"—now that these are the attributes of a good picture, and every true artist's aim, it becomes a very difficult matter to keep our sitters in such a position perfectly still while a reasonable exposure is made; and on the least sign of movement in a figure so posed, the exposure is cut short, and the result is an under-exposed, thin negative, with good qualities in the pose, and life and character in the expression, but it prints dark.

Apropos of this, how many so-called good pictures are there of the old masters—pictures over which connoisseurs are in ecstacy—are so very dark that, to see them in an ordinary lighted room, it is almost impossible to distinguish what the subject is. Taking these much-lauded pictures as their models, are not photographers justified in shading their productions deeply?

This brings me to the Rembrandt lighting. Of course, it necessarily consists of a broad depth of shadow, and, as a general result, if hung on a wall, or examined in a bad light, is dark and heavy; but I know of no style of picture which has given a greater impetus to the photographic business than this, and I will warrant that if there are two artists in one town, one of whom produces good Rembrandt pictures and the other not, the former will monopolise all the trade, as there is no doubt that it is a style of picture and lighting by which an ordinary-looking face can have an attractive fascination imparted to it—that is, by the features being lit up with a strong concentrated light, not abrupt or startling, but gradually diffused over the features and ear (if it is a profile), with a beautiful transparent and delicately-graduated shadow. Add to it a dark, graduated background, with the well-lit profile in contrast with the darker portion. Such a picture will be chosen by nine sitters out of ten in preference to the tame, ordinary lighting, on a face full or three-quarter view.

This is my experience, and I find it to be the present fashion of picture, and largely inquired for. Thus, it pays, is largely adopted, and is the main reason of us all "becoming Rembrandtesque." In support of this, it is a well-known fact that a face which looks charming by gaslight, which is a light emanating from a focus, looks positively plain by daylight, which is a light diffused from a larger area of source.

Of course, the Rembrandt effect is often overdone, as all novelties and attractive results are; it becomes simply mannerism, sinks into a groove, and is used and used, overdone and exaggerated. Then the tide sets in in an opposite direction, and there are now the first symptoms of its commencing—again to be overdone, again to turn. Thus, fashion or style, as well as history, repeats itself.

Again, all papers, essays, teachings, &c., on photography lately have tended to produce dark pictures. The time was when a light background of an even tint to the very corners of the picture, with, of course, an evenly-distributed light all over the picture, all parts equally sharp, was thought to be the very acme of photography, being "so clear and sharp." This has its equivalent in painting in the artist's bestowing an equal care and diligence on every part of the picture, thus supplying no centre of attraction; whereas, if the light on the subject converges to a focus, there is the point of attraction for the eye. Otherwise, the eye wanders over the picture in search of a fixed point of interest, finds none, and turns away dissatisfied and uninterested, or finds the point of interest in a glaring foot-stool or vase of flowers, they being the chief lights in the picture; but, thanks to our advancement in art-matters, we know better. Now we give interest and attraction to the face, and it acquires importance by the retirement of the rest of the picture.

This is attained by shading, and shade is always more pleasing to the eye than light; thus, a judicious use of it in producing a shaded or dark picture secures a more pleasing result, and pleases our customers better; and they, too, are now better educated in art matters than formerly. Some years ago pictures were often returned because one side of the face was darker than the other, as the sitter ingeniously argued:—"I want a portrait of myself, and both sides of my face are of the same shade; whereas here one side is light and the other dark, therefore it is not a portrait of me." We seldom hear this complaint now-a-days.

Having given my answers and opinions on the matter of dark pictures, permit me to say a few words bearing on the present fashion of dress, and the style of hair of our lady sitters, and it is of them we expect to get our best and most charming pictures. But it is now a difficult matter to the poor photographer, and he is often at his wits' ends how to pose to hide some monstrosity of dress. How frequently a lady sitter enters the studio with her dress tied so tight round her she can scarcely walk; stiff and straight, devoid of all grace and free motion and flowing lines, cannot turn without bringing the whole figure round, and, not unfrequently, the shoulders are the broadest part of the figure. Of such it is madness to attempt a full-length, as it places the pyramidal composition in the unstable uncomfortable-looking position of standing on its apex instead of its base; and then the waist, nipped and laced to half its natural dimensions. No wonder the hands look large when they are contrasted in proportion to the waist, as the hands are not subject to any lacing power to reduce them to half their size, like the waist is; thus, they look large and unsightly. And then the hair, flat and close to the head, and, perhaps, smoothed down with some nostrum, till it shines like glass. Result—"How bald my head looks!" "How large my ears are!"

Of such, a side-face gives the best result, as with a good profile you may often get quite a classical looking picture; but still, if fashion perpetrates such monstrosities much longer, and continues as prolific in their productions, I think people will get so disgusted with the resulting pictures that they will give up sitting. And unless the "powers that be" in controlling fashion and style do not go in for a perfect revolution, and give us attire free-flowing and unrestrained—in short, natural—photographers will some day "find their occupation gone." If it is not quite so bad as this, at any rate all pleasure of picture-making will have left his feelings, and he will be disgusted, not with the art, as it is not to blame, but with the productions he is asked to, and what is more must, produce.

When, even now, a finely-draped figure enters my studio, full of grace and free-flowing movement, with a few yards of material in the skirt, the head gracefully poised on the shoulders, and not muffled to the ears with the ridiculous ruffles or collars now in vogue, which make the wearer appear to have no neck, hair dressed free and flowing, with, it maybe, a few graceful curls—when my eyes rest on such a figure, it is to me quite refreshing—in fact, an "oasis in the desert," and the number of negatives I make is quite amazing.

I could write more on this subject, as I feel pretty strongly on the point; but I am afraid to trespass on your space, and I surmise what is my experience is also my brother photographers', and many similar cases will enter their minds as here now does in mine.—Yours fraternally,

Decor Inemptus.

Proceedings of Societies.

Edinburgh Photographic Society.

The third ordinary meeting of the session was held in 5, St. Andrew Square, on Wednesday evening, the 9th inst., Mr. John Lessels in the chair.

The minutes of last ordinary and popular meetings were read and approved, and Messrs. John Jackson, John Terras, and J. K. Tulloch were admitted ordinary members.

Dr. John Nicol read a paper on "The Progressive Results of the Past Session" (see page 29).

The President said that he had used a considerable number of Mr. Gray's plates, and was very much pleased with them. In August last, while on the Continent, he had got excellent results in street views and general architecture in from fifty to seventy seconds, and interiors in from half to three-quarters of an hour; and, so far as his experience went, wet collodion would not have been more sensitive. Mr. Gray's process was certainly a great advance on anything that he had previously tried.

Mr. W. Neilson said the Society had always listened with much pleasure to Dr. Nicol's annual summary of the year's progress, and not less so now than on former occasions. He could not, however, agree with all that had been said, as he thought the glare of light transmitted by the lens in Vanderweyde's arrangement must be very unpleasant to the sitter. He was very glad that carbon printing and enlarging for the trade was now so successfully carried on in Scotland, and, from his own experience, it was well done. Some time ago Mr. Annan had done some work for him, which was really first-rate, and had been highly appreciated by the artists who had seen it. In connection with enlarging, there was one thing that he thought was not so well-known as it ought to be, namely, the kind of negative best suited to the purpose. It was well known that from a negative which gave a first-class silver print it was difficult to get an enlargement that was not tame and flat; but if the negative was purposely under-exposed, and developed so as to be hard, a brilliant and properly contrasted enlargement was easily made from it. This was not his own experience merely, but also that of all to whom he had mentioned the fact.

Mr. Turnbull had had occasion to make himself acquainted with Vanderweyde's system of working by artificial light, and thought he could give some information about it. The electric light was produced by a Gramme machine, which required a two or three horse power steam engine to work it, and was enclosed in a box painted white inside. The rays of light were passed through a lens of circular prisms—such as is used in lighthouses—and could be moved in any direction, as the apparatus was suspended by the rope that enclosed the wires.

Dr. Nicol thought, as the mention of a steam engine might frighten some people, it was well to say that nothing of the kind was used. An ordinary gas engine, that took up little room, was perfectly free from danger, required no attention, and could be started and stopped at a moment's notice, answered the purpose admirably. With regard to Mr. Neilson's objection, he understood that the carbon points were so placed that only the reflected light from the whitened chamber was transmitted by the lens.

Dr. Thompson was glad to say that, as far as his observations had gone during the past year, there was evidently a return to a more healthy practice amongst photographers; they were now evidently looking more to the production of perfect negatives and less to retouching, for high-class work. When retouching, first came in, it was carried to a great excess; and while he did not say that there should be no retouching, he saw with satisfaction that it was gradually more and more being confined to its ligitimate sphere. With reference to carbon printing, he had never succeeded in getting from his own negatives pictures in pigment tissue quite equal in delicacy to what from the same negative could be got in silver.

Mr. Bashford said that if, after sensitising the tissue, it be allowed to dry on plate glass, it will give prints of exquisite delicacy, much finer than on albumenised paper, although he thought it was not always desirable to have such minute datail, as not unfrequently what the albumen surface missed was better left out.

Mr. Alexander Nicol agreed with Mr. Neilson as to the kind of negative best adapted for enlarging. His best enlargements were obtained from under-exposed negatives, such as would be useless for silver printing.

Mr. Mathison thought that by varying the strength of the sensitising solution considerable modification in the resulting prints would be found. He had recently got a very fine enlargement made by the Autotype Company from a negative of his own, taken in the open air, with (of course) a very diffused light. It gave a very fine silver print, and an equally fine enlargement.

On the Treasurer calling the attention of the Society to the fact that the gas-bags, although not having been used a dozen times, were leaking so as to be useless and beyond repair, an interesting conversation arose on those troublesome adjuncts to oxy-hydrogen exhibitions.

Dr. Thompson had used a bag for some years, and it might still be sold for new. He always put lime into the washing bottle, and placed the bag some feet above the level of the water, so that none could be carried into it.

Dr. Nicol knew that the quality of the rubber varied much. He used small bags for the lecture table almost daily, and although he made a point of frequently interchanging the hydrogen and oxygen, one might give way in a few weeks, while another got from the same house and at the same time might last for years. Contrary to expectation, experience had taught him that the thin drab rubber cloth was much more durable than the thick strong black. He generally had hyposulphite of soda in the washing bottle, and sometimes lime, but even then the oxygen was rarely quite free from traces of chlorine. He had frequently found in the oxygen bags considerable quantities of a light straw-coloured powder, which the microscope showed to be portions disentegrated cloth. It smelt strongly of chlorine, and on being tested with silver nitrate gave strong indication of the presence of that body.

Mr. Aird, who is practically acquainted with the manufacture of rubber goods, said that the less rubber there was in a bag, consistent with its being gas tight, the better it would be, and the longer it would last, as it was not so liable to give way by folding when it got hard.

Mr. Turnbull knew that there was much difference in the quality of rubber, arising, he believed, from its sometimes being destroyed by over-heating in the manufacture.

The Secretary distributed a number of copies of the pocket almanac published by the Messrs. Cussons and Co., of Southport, which had been sent for that purpose, and after the usual votes of thanks the meeting was adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting was held on the 10th instant, Mr. A. Brothers, F.R.A.S., President, in the chair.

The minutes having been read and passed, Mr. G. Gregory was unanimously elected a member of the Society.

The President said it was in contemplation to hold a soiree and exhibition at the end of the year, and that a lantern exhibition, including other objects, would form the chief feature of the February meeting.

Mr. Hellawell said he had brought the negatives he had alluded to at the last meeting for the inspection of the members.

The President said experience had led him to the opinion that there really was something in supplementary exposure to coloured light.

Mr. W. J. Chadwick exhibited an instantaneous shutter made by himself many years since.

Mr. Oates read a paper on "Combination Printing for the Stereoscope" (see page 32), and showed some charming specimens, including a number of views by the late Mr. Breese, many of which had been separated to show how it had been built up.

The thanks of the meeting were voted to Mr. Oates for his interesting paper, and the meeting was adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held at the usual place, the Museum, Queen's Road, on Tuesday, 8th inst., Mr. W. W. Stoddart in the chair.

The minutes having been read and confirmed, the entertainment announced for the evening was commenced, viz., a trial of lanterns.

Two lanterns which were expected, did not arrive, viz.:—Hughes' Triplexicon, and a Stella light of the old style. The three shown were therefore as follows, viz.:—Steward's Institution Lantern and Pyro-Hydrogen Light, by Mr. Brightman; Woodbury's Original Sciopticon, by Mr. Davey; and the Euphaneron, with Newton's Refulgent Lamp, by Mr. H. A. H. Daniel.

A number of slides were exhibited, and the verdict was that the first place was taken by the Sciopticon, second by the Newton Refulgent, and third by the Pyro-Hydrogen Light and Steward's Lantern.

It must, however, in fairness be remarked that neither the owner of the Newton Refulgent, nor of the Pyro-Hydrogen, had possessed their lanterns beyond a very short time, and were not sufficiently experienced in the use of them; also that they had on a former occasion a most successful trial.

It was understood a new trial would take place. The testing was most interesting, and occupied the whole of the evening.

To Correspondents.

Opal.—You had better enquire of the Autotype Company. We do not know with certainty that they supply; but they can doubtless give you the best imformation and supply you with the best available article.

T. H. Williams.—If you address Messrs. Goupil and Co. as "Art Publishers, Paris," a letter will reach them. We do not remember the address of the other firm; but think it is in Rathbone Place

D. Smith.—Various causes will produce the red fog which arises during intensification. The most sure preventive consists in the application of dilute tincture of iodine to the film after development and before intensifying. The solution is made by dissolving one grain of iodine for two grains of iodide of potassium in an ounce of water. This is a preventive; but when once the red fog is present, the best plan to neutralize its injurious effect is to treat the negative with a dilute solution of bichloride of mercury. This will slightly intensify the negative, but it will turn the copper-coloured deposit on the shadows white; and this white deposit will obstruct the light so little that the defect will scarcely be noticeable, whilst the red deposit would obstruct the light seriously, and produce white patches in the shadows. You will find Mr. Blanchard's experience with south lighting in our Year-Books for 1877 and 1878.

P. H. Baily.—Almost any proportion of bichromate will render gelatine sensitive to light; but in regard to the best proportion some difference of opinion and practice exists. About one part of a saturated solution of bichromate to ten parts of gelatine solution will answer well. To harden the gelatine with chrome alum immerse it in a solution; but common alum answers better for this purpose. There is, of course, a limit to thickness of the gelatine film. The best thickness can only be determined by experience. See articles on the subject by Mr. Woodbury in various volumes of the News and Year-Book. You will find a practical article in our Year-Book for 1866. The information based on experience gained by practical work is alone of value in a matter of this kind. It is very scarce, and has a high money value in this day.

James E. Langley.—We have forwarded your letter to Mr. F. York, of 87, Lancaster Road, Notting Hill, who has probably the best stock in existence of such things as you require.

W. S.—We have not used, nor seen used, the magnesium light for supplementary daylight in portraiture. It possibly may be of some service, but we fear would not be readily available. Portraits taken by magnesium and similar lights have, as a rule, peculiarities which distinguish the mode of illumination. The illustrations in the periodicals you mention are copyright, and you cannot copy them without risk, without obtaining permission from the proprietors. We cannot tell you the cause of the defects you mention in certain samples of commercial sensitive paper.

Perplexed.—Ammonia is the worst form of alkali which you could use for neutralizing a nitrate bath, inasmuch as nitrate of ammonia, which is necessarily formed, is a solvent of oxide of silver, and frequently causes fog. Its presence should not, however, induce hardness in the negatives. Under the circumstances we should try a new bath. But full exposure and a strong developer will, we have no doubt, rid you of your trouble. Try a newly mixed iron solution of forty grains to the ounce, and about ten minims of acetic acid. Carbonate of potash is the best alkali for treating a nitrate bath.

B. B. R.—Your toning bath turning brown, and becoming inactive, shows that it has been contaminated with some injurious substances. Most probably it has been touched with fingers which have been previously immersed in the hyposulphite solution. It is now useless, and may be thrown away, or added to other old toning baths for recovery of the gold. You should be very careful never to allow fingers which have touched hypo to touch anything else until they have been very thoroughly cleansed. Never use a dish which has been used for hypo for solutions of gold or silver, afterwards. 2. As an amateur, you will find carbon printing very interesting, and not difficult.

I. J. K.—Various articles have appeared in our columns and in our Year-Books on transferring collodion films. Much depends on the kind of work, whether large or small, as to the *modus operandi*. State the kind of work, and we can either refer you to accessible information, or give you some hints in this column.

Danum.—We should use glue for the purpose. Employ it freshly made, and very hot. When quite dry apply size as cold as it can be used. Then, when dry, varnish with a white varnish. "White hard" applied in a warm room will answer.

An Original Subscriber.—There is no esoteric reason against republication of anything valuable, at least none which we should suffer to operate against interest and usefulness. The thing was contemplated, and we once appealed to the writer to revise for the purpose. But a question of copyright stood in the way, a claim being asserted by the former proprietor of the publication which the author disallowed, and so the matter was arrested. Many thanks.

E. H. Parkin.—We should obtain a camera for plates 8½ by 6½ inches, or whole plate, as this size is termed. You will ascertain on trying how far the lens will cover, but it will probably serve for some classes of pictures of that size, such as portrait busts.

An Assistant in a Fix.—The spots on your prints are due to bronze powder used in printing address at the back of mounting cards. The back of the card is removed in the example sent; but the character of the spots is too decided to admit of doubt as to their cause.

The Photographic News, January 25, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

The Art of Business among Photographers — Photographic Experts Wanted in the Police.

The Art of Business among Photographers.—Most people have their own peculiar ideas about business, and photographers are no exception to the rule. We hear a good deal from time to time as to treating the sitter when he is in the studio, but few comparatively tell us about the reception room. And, unfortunately, the business habits which suit one photographer do not suit another, for customers vary much in different towns and in different parts of the metropolis. The prosperous man of business is never tired of giving advice for the benefit of his humble brethren; but, unfortunately, it is of little value to them. A fashionable physician might as well tell us all to act as he does, and never to do anything for the public until a guinea is put into your palm first of all. We know of some studios where the reception room bears an unmistakable resemblance in this respect to a physician's ante-chamber. We have seen ladies and gentlemen pressing round with their guineas and entreating for early appointments in the photographer's day-book. But it would be absurd if one of these fortunate gentlemen were to tell his brethren never to give a sitting until the customer has paid down his guinea, and made a proper appointment. We should all of us like to conduct business on such terms, and compel the public to pay us guineas and to wait our pleasure. As soon as we are successful and command our prices, and may pick and choose, then we can lay down laws and make the public obey them, but until that time comes, we must obey the public. Many say that if we are true disciples of art, and will only pourtray that which is classic and true, success must come in the end to those who can wait. Very good advice, doubtless, but hardly true, we fear, in these worldly days. Poor Rejlander, than whom art photography had no truer supporter, did not die a rich man, and yet he strove for many years as an honest artist; while other men, famed not as artists, but as men of business, have made fortunes out of photography. The great thing is to hit upon the golden mean. We must all live, and if we want to live comfortably—and most of us undoubtedly do—it is necessary that we should make a study of the art of getting money, as well as the art of photography. We are not of those who believe that great fortunes are made by simply honest dealing and arduous labour, but for all that we think that many lose money for the lack of business habit. And that is what photographers should remember. If their art wholly engrosses their time, they should secure the assistance or co-operation of some one else who can give attention to the business aspect of their occupation. With a painter business is a more simple matter, for, maybe, half a dozen transactions in the year are all he is required to look after. The photographer, however, has to look after business every day, and pretty sharply too, if he wants to make money by his work. It will not do, as we have intimated, simply to work hard from morn till night. No fortune ever came that way; no matter how much our fathers preached to us of Whittington and the industrious and idle apprentices. They were never tired of holding up Gradgrinds of society for our admiration as evidence of the colossal fortunes that might be made by hard work and assiduity. The only requisite was to come up to town with three halfpence in one's pocket; you then had five shillings a week as errand boy, gradually became shopman at twenty shillings, and in time blossomed forth as a clerk at one or two hundred a year. Arrived at this point in your fortune—you made the last stride in very easy fashion —you married your master's only daughter, and inherited all his wealth. That is the usual story told to schoolboys, and it exemplifies very well one point to which we would refer in the case of all successful men of business. They do not owe their colossal fortune so much to hard work and industry (although these qualities may have helped them materially in their career), as to a happy stroke of good fortune, which they were wise enough to turn to good account. And photographers are not unlike the rest. Many have comfortable incomes, but those who have made big fortunes—and there are not a few who have done so —will be found to owe the same as much to a lucky turn of the wheel as to their own cleverness. There is, or was, a Brussels firm of photographers who sold no less than 100,000 portraits of a fair princess. It was not because the picture was such a good one, or the pose so charming, that they did this. The portrait was very well done, no doubt, but if the princess had not been so popular just then, and had not fortunately visited Brussels about this time, the photographers in question would never have made three or four thousand pounds over that negative. Another firm we know of, an English one this time, made thirteen thousand pounds over a series of negatives of two Royal personages, while we have the instance the other day of a travelling photographer making a little fortune out of the last negative taken of M. Thiers. In all these cases good fortune has to be thanked more than all else, but, nevertheless, good fortune alone is not everything. Business habits play their parts, for, when the opportunity arises, we must know how to turn it to good account. And this photographers must bear in mind. They must cultivate a knowledge of business in order to make use of the opportunities, great and small, which good fortune sends. All cannot make their fortunes; but all should be able to turn to the best account whatever comes in their way. It is not alone necessary to make good photographs in order to get on in this world. Many, competent to do this, are never able to save a penny, while others, by their keen business habits, live comfortably, while making pictures of very modest pretensions. It may be regrettable that such is the case, but it is none the less true. A photographer's calling is so mixed up with business that it is a *sine qua non* that he should understand it, cultivate methodical habits, and study as much as possible the causes of success and failure from the public point of view. If he has not time to do so, he must, as we have said, get a competent person to help him; but do not let him estimate a knowledge of commercial matters too low, since, after all, in mastering business details he is only doing what is no less required of painters, authors, and even poets.

Photographic Experts Wanted in the Police.—We heard the other day of a very striking instance of the aid which a skilled photographer lent to the police. A man was "wanted," who, like Mr. Toole's hero that "always went home to tea," forgot to pay for some goods which he had taken home with him. It was at Bristol that this unbusiness-like transaction occurred, and the police authorities there borrowed a portrait from one of the gentleman's local friends, and sent it up to town. Here, as a matter of course, copies were made, and these circulated among the police agents of the metropolis. The photographer to whom the copying was entrusted asked the superintendent if the latter thought the suspected one would be recognised from the picture, and the police-officer had no doubt at all on the subject. "He has red hair and sandy whiskers," said the photographer, closely examining the picture. "Do you know that?" The superintendent did not; on the contrary, he would have looked out for a man with very black hair indeed, he said, but of incipient growth about the face. However, the particulars, as he received them from the photographer, were particularly noted in Mr. Superintendent's day-book, and we suppose that the detectives are now looking out for a red man instead of a black one. What chance there would have been of finding the "wanted" individual if the photographer had not acted as expert can be readily imagined.

ON THE PRODUCTION OF ENLARGED PHOTOGRAPHS OF MICROSCOPIC OBJECTS.

BY EDWARD VILES.*

To use sunlight to advantage, a dark room, with one side exposed to the south, fitted with an adjustable mirror or a heliostat, is requisite. The operator then sits, as it were, within his camera, and has all things immediately and easily under control. A condenser is necessary, and nothing answers the purpose better than the front lens of a portrait combination; the larger it is the better. Supposing now that we have a beam of sunlight entering the darkened room, and condensed by means of the lens above mentioned. If we place a sheet of white paper in a suitable position, and cause a microscopic object-glass to slide to and fro in the cone of light, we shall find that there is just one point, and only one, when we have a perfectly illuminated disc of white light. This, then, is the position the lens ought to occupy in relation to the condenser. The microscopic slide must now be placed in the cone of rays at just the focal length of the enlarging lens. If too much light surrounds the object, a higher power must be used; if, on the other hand, the whole of the object is not illuminated, then recourse must be had to a lower power. From this it will be seen that the solar microscope—for, in effect, any apparatus for producing micro-photographs is nothing more—requires to be managed in a manner different from that which the ordinary table microscope requires. With the latter, the slide is placed on the immovable stage, and the objective moved nearer or farther till vision is distinct. In the latter it is the object-glass which is fixed in its proper position, and the stage made to move. Between the condenser and the amplifier there is a certain relation which must always be observed; there is no better way of discovering it than by moving the amplifier to and fro along the optical axis of the condensing lens.

As a rule, little trouble will be found arising from the heat of the concentrated solar rays. Of course, if an object remained long near the burning point of the condenser it would be damaged, but during focussing it is more agreeable to diminish the light by slipping an annular diaphragm over the condenser—sufficient light will be left for focussing by, without any fear of damage by heat. During the brief period of exposure, it is necessary to avail oneself of the full power of the light.

The importance of using a condensing lens of the kind described cannot be over-estimated. Strange to say, the use of it completely gets rid of diffraction, while the exposures are reduced amazingly, thus rendering it easy to photograph animalculæ in motion. To avoid diffraction, some writers have recommended the interposition of a piece of ground glass; this does not answer so well as the condenser, and has, moreover, the effect of immensely increasing the time requisite for the exposure. It also exercises a detrimental effect upon the definition.

I am now engaged in fitting up a dark room for microscopic photography and like uses. I shall be happy to furnish full particulars of it if desired.

The negatives from which the present enlargements were produced were made by sunlight. A brass bar, with a rack on the top of it, carries various brass holders; one of these contains the condensing apparatus, the other is a stage, and another is the holder for the object-glass. A connection is made from this last to a 5 by 4 camera, by means of a cone of leather bellows; the entire apparatus rests in a mahogany box composed of the bottom and one side only. This box is screwed on to the bar of an equatorial stand where the telescope is generally. The object of this arrangement is that one movement of the Hooke's joint keeps the condenser pointed to the sun. The exposures were practically instantaneous, and while they were made of course the handle was not turned. By this means reflection from mirrors is done away with, which is an advantage.

A good magic lantern is valuable for the exhibition of micro-photographs; but instead of making the negative by the ordinary wet process, use a bromide emulsion instead. After development, pour over the plate strong nitric acid; a transparency, instead of a negative, is then produced, and as this is done at one operation there is a manifest superiority in point of sharpness over those which are produced by printing from a negative, as is generally done. Full working details of the production of these transparencies will be found in an article which I contributed to the Year-Book, for 1877.

Considering the importance of recording what is seen by the aid of the microscope, and bearing in mind the facility with which the generality of objects can be photographed, it seems a matter of surprise and regret that there are so few workers in this field. It is an easy matter to adapt a camera to a microscope, and plates can be purchased all ready for exposure, leaving nothing but the development and fixing to be attended to. Under these circumstances a great number of micro-photographs ought to be produced; for though as representatives of what is actually seen there may be some shortcomings, yet they are better than nothing, while the drawing of microscopic objects on paper is a proceeding so difficult and so tedious, that we must not expect many observers to produce them, and then, if ever so perfectly finished, they could not compete in fidelity and usefulness with even a tolerable photograph, which would be produced with a thousandth part of the labour.

With regard to the production of the negatives themselves, I have only to say that they were made upon selected glass, flat, thin, and absolutely free from specks, blisters, and scratches, coated with a collodion giving a structureless film, sensitised in a normal silver bath, developed with iron, fixed with cyanide, and neither intensified nor varnished. Of course the utmost care was used to secure to secure cleanliness in all the operations.

As to the microscopic objectives made use of, their only peculiarities are that they have an arrangement by which suitable stops can be inserted for the purpose of increasing the depth of definition, and that they are furnished with an extra lens—a double convex of suitable focus—which screws into the place usually occupied by the back stop. The purpose served by this extra lens is to bring the visual and actinic foci into coincidence. This arrangement is Mr. Wenham's, who recommended it many years ago. In my hands it has answered perfectly.

In conclusion, I have to express the hope that increased attention will be given to this fascinating branch of the photographic art, and that next year, if a medal is offered for micro-photographs, there will be a goodly number of competitors for it.

COMBINATION PRINTING FOR THE STEREOSCOPE.

BY S. H. ASHLEY OAKES.*

Now, as paper is not a suitable material for pictures that have to undergo the test of the stereoscope, and glass may be considered to have serious drawbacks commercially, I have a suggestion, which is quite at your service. It is to print your slides, or transfer them to gelatine or tough collodion films or tissue, and use them with some arrangement akin to Mr. Warnerke's roller dark slide, so as to bring a succession of pictures into the field of view instead of the somewhat clumsy arrangement at present in use, which is always getting out of order. I mean the boxes to hold from fifty to one hundred slides. You have tissue negatives. Why not tissue or pellicle transparencies? I have made experiments in this direction that warrant my recommending this to the serious notice of those in the trade.

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* Continued from page 28.

* Continued from page 33.

The four slides you will find on the table are glass subjects taken by Mr. Breese. It may not strike you that there is anything very out of the way in these slides, or that they are superlatively good of their kind. They are, however, as near perfection as possible, and you will find they are all composed of as difficult a combination of things as could be brought together to test a photographer's skill; but you will find every bit of tender reflected light, and half light is present as in nature itself—every bit of detail, from the highest light to the deepest shadow. Nos. 1 and 2 were photographed on Mr. Breese's own drawing-room mantelshelf. His brother, being in the glass trade, accounts for his having so many beautifully-cut glass and other ornaments. The exposure for the negatives, Mr. Breese told me, was twenty minutes.

I may as well mention here, once for all, that Mr. Breese's transparencies are camera printed, and that he invariably used pyro. development. He worked with the ordinary three-grain pyro. developer reduced three times, or a one-grain pyro. developer. For his very quickest pictures (no man ever did quicker ones) he used no stronger a developer than the usual three-grain pyro. I could never induce him to give the iron developer a fair trial. Once, indeed, he tried it at my urgent request, but the quality of picture he got did not satisfy him, and I could not get him to try again.

Mr. Breese kindly spent four hours in colouring me a duplicate of No. 7 slide, for which I paid him a guinea. I regret to say it has since come to grief. It was most beautifully coloured—not both sides alike, as I have seen some transparencies done; but in colouring one of the lustres, for instance, he would proceed thus:—He would put on a dab of perfectly transparent yellow on one side of the stereoscopic picture, and the corresponding portion of the lustre on the other side he would put a small dab of prussian blue and a small dab of red, so that the blue and red should partly overlap the yellow when seen in the stereoscope, and he would proceed thus with either side of the slide till it was done, in no instance painting the two slides alike. Suppose he wanted to paint a tree or a field, he would paint one side of his slide with broken yellows and the other with broken blues, and the result when seen in the stereoscope would be various shades of green. The difficulty is in getting colours sufficiently transparent and pure for the purpose, otherwise most charming effects may be got, especially when prismatic hues are to be represented.

A silver ewer figures in three of the slides on the table. This ewer was given to Mr. Breese by Mr. Elkington as a present, in acknowledgment of some service he had rendered that gentleman in photographing his family and house at Croggan, North Wales, and for which Mr. Breese refused to accept payment. Inside the jug was a ten-pound note, with the following words written on it:—"To pay for the collodion"—a very handsome and neat acknowledgment on the part of your respected townsman.

You will find on the table two moonlight views. These are favourite subjects with Mr. Breese, and he is the only man who has any real success in giving moonlight effects for the stereoscope. Sometimes Mr. Breese took negatives on purpose to convert them into moonlight transparencies, and these are generally his best productions; but, if it so happened that he found he had got an under-exposed negative, he would not allow the development to go too far, and would put it by to make a "moonlight" of it at some future time. The negatives, when taken with a view to be turned into moonlight pictures, were carefully studied beforehand, and a favourable opportunity of taking them was patiently waited for from day to day. They were then taken with short exposures in full sunlight, and the development stopped before too much detail made its appearance.

Now, in printing a transparency for a moonlight picture, the moon has to be printed in where the sun really was in taking the picture. This is done as follows. I am now about to come to the pith of my paper, and to tell you what no living man besides myself knows anything about, and this is combination printing for the stereoscope, though I should not be at all surprised if some one crops up in future who knew how it was done all along. In giving this information I do not wish to take any credit to myself. I did what any man might have done under the circumstances. I bought the information with the negatives, and I bought the negatives for the information. I gave Mr. Breese for the negatives a cheque for £80, intending some day to go into the matter commercially (which I may do yet, as far as I know), but at present the information is of no service to me, and I thought it might give a fresh spurt to the trade if I tell you what I know about the matter.

I find the time is slipping away, and that I must bring my paper (or, rather, the first part of it) to an abrupt conclusion, as I wish to afford you sufficient time for discussion and to answering any questions that may occur to you. I think I can promise you a more interesting paper next time. I shall begin by telling you how moons, sea-gulls, clouds, animals, figures, &c., may be printed into transparencies. I shall tell you, as far as I know, Mr. Breese's pet solutions and formulæ. I shall show you my printing apparatus, made according to Mr. Breese's pattern, and shall, if possible—but this I cannot promise—print a combination picture in your presence.

GERMAN CORRESPONDENCE.

BY DR. VOGEL.

Supplementary Exposure—Visual Purple—Mezzotint Pictures—Salicilic Acid in Intensification—Mounting Large Prints—Glass Prints—Printing Blocks—Herr Warnerke.

In writing to our Philadelphia contemporary, Dr. Vogel remarks that the Scotellari mode of supplementary exposure, successful in fine weather, has proved unsuccessful in bad weather:—"The good results which were obtained in some cases during the summer were never regained. Mr. Trüll, of Berlin, makes use of after-exposure in cases where he is convinced that the negative is under-exposed—in taking photographs of children, for instance. He keeps the lens-cover, backed with black velvet, in an inclined position before the lens, and reflects thus for a few seconds a weak light on the plate.

"I communicated to you last year about the new discovery of visual purple, a sensitive substance on the retina, which is bleached by light, so that a positive picture is formed on the retina by the act of viewing a subject. This guided the preconception to regard the distinction of subjects by sight as a photographic process. This opinion, however, has to sustain a great limitation, as, according to Prof. Kuehne's recent discoveries, the phenomena can also take place in the absence of this purple. This may be proved by viewing a subject in a manner that the axis of the eye is directed straight to it, in which case the picture will be situated just on the yellow spot in the centre of the retina, which contains no purple. Kuehne made his experiment with frogs. He exposed the same a short time to sunlight, in order to destroy the purple, which is only reformed after a space of thirty minutes. During all this time the frogs could not only see, but they even distinguished colours. Kuehne proved it first by stating that frogs like the green colour. They always moved to the green window-glass of a box, with different coloured window-glasses, in which the frogs were kept. They continued doing so after the purple in their eyes had been destroyed by sunlight. This proves that the visual purple has but very little to do with the action of seeing.

"A photographer lately told me of a very simple method of producing pictures with mezzotint effect. He exposes about half, moves then between subject and lens a glass plate to and fro, which produces a slight unsharpness which takes the hardness from the picture.

"Lately salicilic acid is recommended for strengthening. Mr. Richter gives us the following formula :—

Iron developer	1 part
Nitrate of silver solution, 2 per ct....	1 ,,
Saturated solution of salicilic acid...	1 ,,

The latter has reducing power, and keeps the plates clean. Richter pretends even that the use of salicilic acid will give more details.

"The mounting of large pictures is difficult, and I should think that a simple manner of mounting the same would be well known. Instead of laying the Bristol-board on a table, it is fastened on the wall or on the door. It is now exceedingly easy to get the picture in the right position on the board without any wrinkles.

"In my last letter I wrote you about the excellent glass-prints of the Royal State Printing House, of Berlin. The method of manufacturing them is now published. Mr. Brem, director of the said institute, resumes as follows :—An albumenized glass plate is collodionized with a collodion which produces a hard picture. After exposing, strengthening, and fixing of the same, it will be coated with a thin coat of a solution of gelatine and bichromate of potassium, dried, and exposed again from the rear until the drawing appears dark blue. The remaining soluble chromate is then to be washed out with cold water, and the plate inked in with a thin lithographic printing ink. In order to get rid of the still remaining half-tones, the plate must now be etched with a solution of gum, with an addition of gall. The plate is at once ready for printing, and needs to be treated like a lithographic stone. It will not stand many impressions. One impression, however, on a stone will give thousands of duplicates afterwards. Mr. Reiding, of Berlin, performs an impression on zinc, which he takes afterwards and produces thus a printing-block for the block-printing press. This method is undoubtedly one of the easiest heliographic methods ever known. It does not reproduce thin half-tones, and for this reason it can only be used for the reproduction of drawings in lines.

"Mr. Warnerke, of London, was recently in Berlin. This gentleman has acquired a great merit in emulsion processes. He showed me some of his own emulsion, which was astonishingly sensitive. He made some views in my studio just as quick with emulsion as with the wet-plate process. Of course, his plates had not quite the same harmony in shading, in which the wet plates will always be the victor. His results were good enough for all cases in which the highest effort of art is not required. Mr. Warnerke showed me also his emulsion papers and camera, which indeed represents the possibly simplest and most agreeable instrument for travelling photographers. Instead of taking heavy glass plates, one has a roll of emulsion paper in the plate-holder, in which it can be unrolled so that one hundred pictures can be taken on one piece of paper. I described to you this apparatus two years ago, so that I dare suppose it is known. Mr. Warnerke is on his way to Russia, hoping to introduce his invention in St. Petersburg, for use in the army during the present war. He thinks to make it possible to take instantaneous views of the whole battle-field by means of a balloon, in which the camera is to be raised up to a certain height, from which, by means of electricity, the lens will be uncovered for a moment. We shall learn, perhaps, by his camera if the soldiers in Plevna have still provisions or not."

PELLICULAR NEGATIVES.

BY KARL VON STEFANOWSKI.[*]

THE pellicular negatives, made by means of carbon and then transferred to a thin flexible film of gelatine, have now become an important article in photographic commerce.

The pellicular negatives are known here under different forms, such as negatives of a cloudy sky to make an artificial sky for landscapes, or as vignettes of designs, called Luckhardt's, being imitations of marbles, leather, wood, shagreen, &c., or as negatives of borders for transparent carbon pictures, or, under the name of graded vignetters, for making on the print a regular and delicate vignetting.

It appears to me that each variety of these negatives being a novelty which will necessarily interest your readers, I will divide what I have to say about them into three parts.

1st. *Cloud Negatives.*—Persons who buy photographs of landscapes are struck with their cold and flat appearance; this defect is occasioned by the fact that the portion representing the sky is uniformly grey or white. It is not possible to obtain in the same negative a landscape, a building, or of a public place, at the same time with clouds of the sky, which form a background for them, and give them the stamp of natural beauty; in fact, the terrestrial objects require twenty times more exposure than the sky. It has been sought by all to find a remedy for this patent defect. Some persons have attempted to imitate the natural sky by means of tufts of cotton, but this is too rough a method to give results anything like the truth, and all the best photographers have long since abandoned it, and have been content to print their views with plain skies. Other persons have proposed to whatever view a sky of uniform description. This mode is reasonable enough and gives good results, but, unfortunately, is used by very few operators.

Every landscape photographer, then, ought, it appears to have a collection of cloud negatives, and never send out a view with a plain, flat sky. But this is not as simple as it would seem at first sight. In fact, it is necessary—

1. To have had experience in making cloud negatives, for it is not as easy to photograph the sky as an ordinary view.

2. To be at liberty to take a view at the moment when the sky is covered with fine clouds sharp and well lighted; and this does not happen every day.

3. To go into an open field, or, better still, to some elevated point, with all the necessary apparatus; and then it often happens that, upon arriving at the spot, the clouds have disappeared and have become not worth taking.

The pellicular negatives alluded to, and which I have brought to the notice of the Photographic Society of Vienna, 17th October, 1876, have been for the above reasons very favourably received, and have been since that time almost a necessity for every photographer who has tried them. These negatives, costing but little, made, as I have already said, by the carbon process, are pellicular negatives on a flexible gelatine support, covered on both sides with collodion. They necessarily possess great advantages over ordinary negatives on glass. Their flexibility prevents their breaking, they occupy but little space, and are easy to use. They can neither be scratched by rubbing against hard surfaces, and they cannot split off. Finally, they can be printed from either side the gelatine support, being so thin as to preserve all details in printing. This is a great advantage; for in the case of two landscapes, one lighted from the right and the other from the left, a single pellicular negative can be used, whereas two glass negatives would be required.

It is here proper to observe that the pellicular negatives of clouds are so made as to shade off at the horizon, whereas with the ordinary negatives on glass it is necessary for the printer to do this by hand while printing. By this preparation the proper effect is already produced, and the printer is relieved from using any judgment in the manner.

Manner of Proceeding in Printing from these Negatives of Clouds.

1. If the negative to be printed be from a grey or mottled sky, it must be made perfectly opaque. This can

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[*] *Anthony's Photographic Bulletin.*

be effected by applying to it on the varnished surface a coating of Gibon's opaque.

2. When the print is completed the cloud negative, with the direction of the light properly arranged, is put in the pressure frame, taking care that the lower part of the sky in the print corresponds to the part of the cloud negative the nearest to the horizon.

3. On the front of the glass of the pressure-frame, all the portion already printed on the paper is masked by a piece of black paper to about one-third of an inch above the horizon, if the glass of the pressure-frame is very thick, and one-sixth of an inch if the glass is thin. It is not absolutely necessary that the black paper be cut to follow the exact outline of the horizon. A mask cut on a straight line of the average of the horizon will be sufficient, as the cloud negative at the horizon is so opaque as to produce no effect upon the parts already printed.

4. Finally, the exposure is made, and when the details of the clouds are sufficiently printed, the operation is finished.

STEARINE RELIEF PICTURES.[*]

This stearine relief process depends upon the property which bichromate of potass, mixed with gelatine, has of becoming insoluble by light. If a glass plate be covered with this mixture, and exposed in the ordinary way, in its after-manipulation in water those parts not touched by the light will swell up, while those acted on by it, and consequently insoluble, remain flat; in fact, a relief is formed from which any number of impressions in stearine can be taken. These stearine impressions are afterwards rubbed with silver powder, stuck on blue paper, and the effect is something charming. They are produced in the following manner.

When the impression has been taken, the relief must be finished on a flat, stiff surface—a glass plate, for instance. Consequently, no transfer can take place, on which account the half-tones are in no way injured in washing. The exposure must be from behind, which, naturally, can only be done if the gelatine layer is spread on the negative itself, and this is no very great difficulty. The collodion used should be a good portrait collodion, if possible containing a little water; it is also improved by the addition of a little castor oil. Moreover, the use of crown glass may be recommended, and, before collodionising, flood with a solution of albumen, and let dry.

After the negative has, in the ordinary way been exposed, developed, fixed, and well washed, it is then either placed in rather hot water, or flooded with it for some minutes, the temperature about 25° to 30° R. This preliminary warming is on account of the future pouring on of the chrome-gelatine solutions, and is very important.

1 { Nelson's patent gelatine ... 75 grammes
Distilled water ... ... 1 kilo.

and then—

2 { Bichromate of potass ... 10 grammes
Distilled water ... ... 100 ,,

The commercial gelatine usually made from calves' feet is absolutely useless for employing in this proceeding, it not giving sufficient relief.

The gelatine of better quality, which I have mentioned above, is produced by Nelson, and is prepared from an algæ, or moss, and answers excellently for this process.

From mixture No. 2 add a small quantity in drops to the gelatine solution, keeping it continually stirring, estimating the mixing at about 3 drops to the 100 cb.m. (Of course, both solutions must undergo careful filterings.) From this warm mixture a small quantity should be poured on the now wet and warm negative, carefully avoiding air-bubbles, and spreading it equally in all parts. This is only preliminary, and serves to produce an isolated layer between the original and the relief, and prevents, in after washings, the dark parts of the negative relief layer, which are under, from being washed out.

After having treated the negative in the manner described, this gelatine solution, mixed with the bichromate of potass, is run off at a corner, and the plate then placed for a short time in the light to dry, and any superfluity of the mixture removed with gentle washing. Now the second—the real relief-producing liquid—can be employed.

Beforehand it is well to surround the plate-glass (which it is advisable to have somewhat thick) with a margin of cardboard, which can be either stuck on, or tied firmly round it, so as to form an edge about five millimetres high. This edge serves to prevent an overflow of the gelatine solution. Into the dish thus formed is poured the gelatine solution, which, by the addition of the bichromate of potass, has been rendered sensitive to the light, and the negative covered to a height of some three or five m.m. One must anxiously avoid air-bubbles. Afterwards thoroughly dry in a horizontal position in a warm room. Then it can be exposed, taking it carefully, in such a way that the negative (*the gelatine side downwards*) is placed on a board covered with black cloth, and for some hours exposed to the diversified rays of the daylight. By proper exposure, the gelatine layer assumes a yellow-brown appearance.

The *development* of the picture is comparatively easy. Pour into a dish some thoroughly hot water, into which the plate should be *once* dipped. The temperature of the water employed varies according to the quality of the gelatine used. As a working rule, it may be observed that *the higher the temperature of the water the greater* the *relief obtained*, as it rises energetically. Bubbles are not to be feared if a good gelatine be employed.

As observed, nearly every quality of gelatine has its own temperature at which it swells most readily. To find this out is a matter for investigation—still, soon arrived at; in any case, it is preferable to use a gelatine that always gives the same results. With Nelson's gelatine the temperature at about 50°R. is the best.

On the application of the warm water the relief comes up quickly, those parts unaffected by the light swelling rapidly up, whilst those acted on should remain flat and solid. We can now perceive over the thick places of the negative a partial solution of the gelatine spreading itself under the isolated layer—in other words, a bas-relief forming on the sensitised gelatine plate, in which the lights, and especially the light parts, lay deeper than the shadows.

On the contrary, if a diapositive be covered in the manner described, with the sensitized gelatine mixture, and afterwards exposed, the light parts would let much light through, by which the gelatine layer would be affected to a considerable depth. By the manipulating in hot water afterwards the insoluble parts remain, and we obtain *high relief.*

In most cases the production of the bas-relief is to be preferred, which can be regulated according to the flooding.

The gelatine should be then prepared with a layer of a well concentrated solution of white shellac dissolved in alcohol; the stearine melted over a gentle fire, and then poured, carefully avoiding air-bubbles, over the gelatine. On its drying, turn up the plate, and a few taps on the back will remove the impression.

In conclusion, rub the impression over with silver-bronze, and mount on a piece of blue paper or card. A great improvement to this process is to be arrived at by carefully mixing marble or alabaster powder (such as can be obtained from sculptors' studios) with the stearine. Melt the stearine over a gentle fire, and add in small quantities the powder, carefully stirring and watching the mixing. In pouring into the mould, the powder sinks, so that the top layer of the stearine impression presents the appearance of finely sculptured marble.

In conclusion, it is well to remark that in producing reliefs of persons with light or golden hair, it is well to powder the same; otherwise, as in photography, the gold comes out black, and the hair in the stearine impression appears too sunken.

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[*] *Photographisches Wochen-Blatt.*

The Photographic News.

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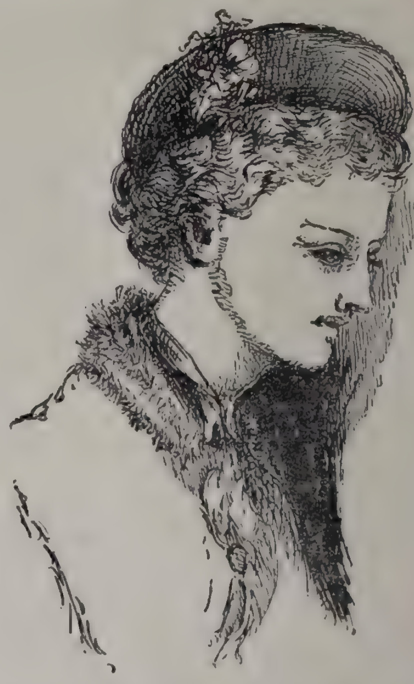
PHOTOGRAPHIC ETCHING.

The process of producing etched negatives for printing on sensitive paper has been discovered and rediscovered many times, but it has never become common, probably because some skill in drawing is necessary to render the method of any service. For the benefit of those of our readers who are not familiar with the technics of the graphic arts, we may, before proceeding further, briefly explain in what etching proper consists. In ordinary etching, a prepared copper plate is covered with a coating of what is termed an *etching ground*, consisting of a mixture of asphaltum, Burgundy pitch, and bees-wax, or similar bodies. This, when dry, forms a surface which is easily cut through with the point of an etching needle without leaving ragged edges. A design or picture is produced by the artist with the needle, which removes the etching ground, leaving bare the surface of the copper plate. When the design is completed the process of *biting-in* follows, dilute nitric acid, or some equivalent preparation, being applied to the plate, which is bitten by the acid in every portion laid bare by the etching needle, whilst that still covered with the etching ground is preserved from the action of the acid. The plate, being cleaned, presents a design *bitten-in* in lines, and is printed like an ordinary engraved copper plate. This is a rough outline of one of the most simple and delightful processes of engraving, yielding, in artistic hands, the most charming results.

The application of the idea to photographic printing is not difficult to understand. A plate of glass, being covered with an etching ground, is etched with the needle in manner similar to the copper-plate. A negative is thus produced, which may be used to print on sensitive paper. A very simple and facile method of multiplying drawings is thus secured. The drawings must, of course, be in line, or similar mechanical gradation, capital imitations of line engravings being so produced. An adaptation of this process has been used in Germany and in America as a means of improving photographic negatives, especially in art compositions, and occasionally in portrait backgrounds, various effects of shade and texture being introduced in draperies and background accessories, by working on the negative with an etching-point, cutting through the dense film, and by means of line and cross-hatching introducing texture and shadow. Some examples of this work might have been seen in the work of Mr. Gutekunst, of Philadelphia, in the late exhibition in London. Mr. Woodbury devoted some experiment to the process some years ago, and succeeded in inventing an excellent etching ground for glass plates.

The most recent of the successful experimentalists in this direction is Mr. Sutcliffe, of Whitby, who hit out the idea independantly as an original one, and sent us some good examples. In the following note he describes his operations :—"A glass plate is coated with a thin non-actinic film of paint, varnish, or collodion, and dried. The artist scratches on this film with an ordinary copper-plate etching-point. When the drawing is finished, the plate is handed over to the printer, who, without any further preparation, proceeds to make prints either by the silver, photo-lithographic, photo-typic, or any other method suitable for line work."

We understand that Mr. Sutcliffe intends publishing his plates, through some London house, for the use of artists, &c. One of the practical applications for which he proposes the process is the production of printing blocks by the same method as photo-typic printing blocks are produced, and he has favoured us with an example block, which we here print. The head is drawn with an etching-point on a prepared glass plate, which is used as a negative for producing the block. No elaborate light and shade is attempted, the drawing being light and sketchy—little more, in fact, than outline, a style generally best suited to etching operations.



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SCIENCE INSTRUCTION FOR PHOTOGRAPHERS.

The better scientific instruction of photographers is devoutly to be wished. As matters stand at present, there is no place in this great metropolis of ours where beginners and assistants can learn something of the chemistry and physics of photography, no course of lectures they can attend, no classes in which the why and wherefore of the reactions they see every day are explained. Of course, there are handbooks to be purchased in plenty and instruction in pure chemistry to be had by those who can devote time to attending our London schools and colleges, but these are not what photographers want. They have no time to go through the whole science of chemsitry, with the object of acquiring a knowledge of just what concerns them, neither will the studying from alpha to omega of a text-book teach them what they more particularly want to know. What is required is a series of lectures given by a thoroughly practical photographer and chemist, in which all that concerns photography, and little else, should be treated.

It may be said that those who really desire to learn may pick up a good deal of knowledge by attending the meetings of societies, and listening to and taking part in their proceedings. No doubt that is true to a certain extent, but it must be borne in mind, a discussion is often shared by those who have knowledge, and those who have none, and a beginner, if he knows no better, might treasure up the sayings of one just as much as the other. One hears strange things uttered sometimes in the discussion of a paper, which it would never do to regard as *dicta* beyond question. And the more determined are a gentleman's opinions, the less foundation is there generally for them. A profound chemist often hesitates to hazard a judgment upon this or that point which has long since been decided by him who knows less about it.

Therefore, we say, one does not always learn the truth by listening to the discussions that take place at societies meetings, and it would be well, we think, if these bodies were to consider if something could not be done to supply the instruction which many photographers lack. We have talked of beginners and youthful disciples of the camera, but we fully believe that were it possible to establish a course of lectures upon photographic chemistry, the same would be attended by a large number of gentlemen, well established in their profession, quite as eager as their juniors to derive what benefit they could from the series. We believe London stands alone, among the great metropolises of Europe, in not offering to photographers the advantages of public lectures on the subject. In Paris, Vienna, and Berlin such facilities exist, while at Brussels, a far less important capital, there is a public photographic laboratory and a public professor. The Photographic Society is quite strong enough to take up the matter if it would, and there is no apparent reason why it should not. Other societies—to wit, the geological, the astronomical, and the chemical—from time to time have lectures in elucidation of branches of the science which are not generally studied, and the same example might surely be followed by bodies interested in the art-science of photography.

We have so far only spoken of better instruction in the science of photographic chemistry, but there is no reason why the art-aspect should not be taken in hand also. Only it would be well, perhaps, to begin with science, as instruction on this score could doubtless be more readily obtained. There are several eminent men in London distinguished alike for their chemical and photographic knowledge, and for this reason there would scarcely be any hitch in the plan, if it were only once started by somebody taking the initiative.

FRENCH CORRESPONDENCE.

New Publications in Paris—Notes Photographiques, by Dr. P. E. Liesegang—Aide Memoire Photographique—The Taupenot Process in the Hands of M. Queval—Dodges in the Development of Taupenot Plates—M. Boivin's Electric Experiment with Collodion Plates—Removing the Film by Electricity.

The publishing firm of Gauthier Villars has just put before the public "Notes Photographiques," a work of M. Paul E. Liesegang, full of practical and precious information. Subjects of a most diverse character are treated of herein, and all of them from a practical point of view. Wet collodion, emulsions made with collodion and gelatine, pellicle clichés, printing with silver and carbon, ferrotype, microphotography, &c., are treated of in various chapters, and everything thoroughly, yet in a concise and succinct manner. Tedious description is avoided, so that the title, "Notes," should hold good throughout.

In a chapter which serves as appendix and supplement to this interesting work, and which M. Liesegang has headed "La Galerie Vitrée," the author has conceived the excellent idea of combining a series of engravings representing the different ateliers of the first photographers in Europe and America. These sketches, to which are added particulars and descriptions of all kinds, give us a complete and exact account of the means taken by the masters of their art to secure success.

The same publishing firm has also brought out the "Aide Memoire of Photography for 1878," edited by M. Fabre. It is now three years since the author started this work, and we may state that, since its commencement, it has gone on improving. Not only has that portion of the work devoted to general instruction been completed by degrees, but the review of photography, in which all novelties are reviewed, has assumed an importance which it did not before possess. It fills no less than eighty pages of the volume we have now in our hands, and in communicating all the various points of one novelty after another, M. Fabre adds the results of his own personal experience in regard to them. The collodio-bromide and gelatino-bromide emulsions are respectively the objects of systematic investigation.

One of the most skilful of Paris photographers, who has remained faithful to the Taupenot process, and who has succeeded well with it—for his stereoscopic views are among the most perfect we have seen—M. Queval, has just forwarded us an interesting pamphlet upon this process, which possesses so many advantages. I should be very glad indeed to let the readers of the Photographic News have an analysis of this valuable paper, but to suppress the details in the precise indications that are here afforded would be to take from them all their usefulness, since the least explanation has its practical worth. Nevertheless, I will reproduce two paragraphs from the manuscript which contains so much that will be useful to working photographers.

It sometimes happens that in a landscape there are high lights which impress the plates in a few seconds, and other portions of shadow which require an exposure of several minutes. This disproportion is shown upon the cliche by contrasts and hardness which may be attenuated in the manner following:—If the plate is of a certain dimension—say, 18 centimetres by 24—as soon as the parts most lighted up are revealed in the first alkaline bath—

Ordinary water	100 cub. cents.
Water saturated with carbonate of ammonia...	10 "
Pyrogallic acid solution of 10 per cent. strength	10 "
Bromide of potassium solution of 10 per cent. strength	10 "

Then the plate is washed with spring water to arrest the development upon these special portions. As to the other parts where the negative is longer coming out, they are touched with the developer again (the plate held face downwards), care being taken that the liquid does not wet the portions already developed thoroughly. If the distribution over the lights over the negative prevents this manœuvre, a very soft brush is taken, and the liquid thrown upon the surface by its means until the desired result has been secured.

If any portions of the plate should refuse altogether to be acted upon by the developer, you put into a test-tube some carbonate of ammonia and pyrogallic acid, as above indicated, diminishing the proportion of water to two-thirds or three-quarters. This solution is then applied gently with a brush as many times as may be necessary. In this way an otherwise hard negative may be endowed with harmony.

It is sometimes the case that, for fear of having a negative of too weak a nature, the development is pushed too far, and instead of a harmonious result, a hard cliché is obtained, that prints with difficulty.

M. Queval recommends that whenever the softness of a negative is in doubt, a print should be taken before varnishing, and if the result proves that the plate is too hard, then it is weakened or softened in the manner following:—In a bottle is kept ready for use, and well stoppered, a solution composed of—

Water	250 cubic cents.
Iodide of potassium ...	10 grammes
Iodine	2 ,,

Some of this liquid is poured into a dish, and a negative dipped therein; the liquid is shaken so as to cover the plate thoroughly. The iodine in the solution combines with the reduced silver, and forms iodide of silver. The amount of this substance that is formed may be judged by the intensity of its yellow colour. A subsequent immersion in the bath of hyposulphite suffices to remove from the cliché a portion of its opacity by dissolving out the iodide of silver. After energetic washing, the operation may be repeated, if considered desirable.

M. Queval also indicates the means of correcting in a cliché any very high lights which are sometimes termed solarized. This may be done without influencing the rest of the negative. You commence by moistening the surface of a cliché with ordinary water; after this, iodine water is applied to the defective parts, either by the aid of a brush or partial immersion. A negative of large proportion cannot but be benefited by such treatment.

The Taupenot process is that which lends itself best to all these *tours de main*—or dodges, they may perhaps be called—because of the extraordinary solidity of the albumen film.

It is well known that M. Boivin has expressed his belief that the tenacious adherence of collodion to glass is due to electricity. He tell us of the following experiment which goes to support this opinion:—A plate is covered with collodion, and, after the same is dry, it is charged with electricity on the back, or, in other words, opposite to the collodion. In this case no result will be remarked. But if, after cutting the collodion five millimetres from the margin, the plate is charged with negative electricity, it will be found that the film will at once be lifted. If now the plate is charged with positive electricity, the film once more adheres to the glass with all its previous tenacity. It is during the polishing of the glass plate with a piece of flannel that electricity is produced. The result is the more striking if the weather happen to be fine and dry during the time of exciting the plate, and in the event of the collodion being charged with resinous matter.

ON THE APPLICATION OF DRY-PLATE PHOTOGRAPHY IN PHOTOGRAPHING (WITHOUT A CAMERA) TRANSPARENCIES OF ROCK SECTIONS OF FOSSILS FOR PROJECTION.

BY PROF. J. S. ST. JOHN.*

On account of the expense of grinding thin sections of fossils, and the difficulty of duplicating many varieties, I was led to try photography as a means to copy these sections on glass for use in projection.

I found that in photographing with a camera by transmitted light the sections were too opaque to produce an image on the ground glass of sufficient intensity to tell when the fine lines were in focus, and that with such fossils as sponges and corals much of the detail was lost. In attempts at projection by using the section in the lantern I met with the same difficulty. By using a microscopic objective, not enough of the fossil could be brought in the field.

For some time I have been preparing transparencies for class work by using dry plates, and printing from negatives by contact, and have obtained good results; consequently I resolved to try photographing sections with dry plates, using the section as a negative. The trial was made, and to me the result is very satisfactory. We shall soon see some of these photographs projected on the screen.

I will now give a description of how the dry plates may be prepared, and of the process of photographing the sections.

To Prepare the Plates.

In selecting the glass, only those pieces should be used that are free from blisters and other defects. It may be cut in pieces 3¼ by 4¼ inches, which is a convenient size for the lantern. After washing the glass it is albumenized. The albumen may be prepared by taking the white of one egg, 300 c.c. of water, and 12 drops of carbolic acid. Shake thoroughly, and filter through a sponge.

For the silver bath use 30 grammes of nitrate of silver for every 300 c.c. of pure water. The bath should be acid, and in the best condition. If the dry plates are to be used for negatives, use any good collodion. If for positives, it should be made thin by adding equal quantities of ether and alcohol. Flow the plate with the collodion, and place it in the silver bath, as in the wet process. When it comes from the bath it is held under the tap and washed thoroughly on both sides until all signs of greasiness disappear, when the plate is flowed not less than three times with a preservative, allowing it to flow from the plate into the sink each time. I have tried many of the preservatives that are used with dry plates, and have found none so simple as what is called the coffee preservative, which may be prepared as follows:—

H^2O	300 cub. cents.
Java coffee	30 grammes
Rock candy (white)	18 ,,

(Boil the whole fifteen minutes, and filter.)

After the plate has been flowed with the preservative, it is placed in a rack to drain. When the desired number have been prepared, they are placed in a dark box to dry. I have found that when the plates are allowed to dry slowly in this way, they are much better than when dried quickly. Plates made in the afternoon are ready for use the next morning. If a large number of plates are to be dried, it would be well to place them in different boxes, so that if the door of one was left open through carelessness, only the plates in that box would be spoiled. I have kept plates a year before using. If tannin instead of coffee is used, they will keep for years. I made some of Newton's emulsion, and tried it with the coffee preservative with good results. If a person could buy this emulsion prepared it would save one-half of the work in preparing the dry plates, and would secure more uniform results, for, by using it, the silver bath is dispensed with, as the silver is placed in the collodion. But perhaps for beginners the emulsion process would be too difficult. We will now consider how these dry plates are used in photographing the rock section.

The section, with the dry plate in contact, is placed in a photographic printing frame, and exposed to diffused light from four to forty seconds, according to its intensity, the kind of dry plates used, and the character of the section. A coffee plate is more sensitive than a beer plate, and the Newton emulsion more sensitive than either. The exposure may be made at night, to gas or lamp light. Many of my best prints have been made in this way. There are important advantages gained by working by artificial light; for, *e. g.*, the intensity of the light is nearly constant, while the intensity of sunlight varies every hour of the day, making it more difficult to determine the proper length of time necessary for exposure. If we find that forty seconds is the time required for an exposure by lamp light, we know that all prints from that negative, or others of like intensity, will require the same time.

After the plate is exposed, it is taken to the dark room and developed. This is accomplished by taking the plate as it comes from the printing frame and holding it under the tap for a short time, until the film is thoroughly wet, and then flowing it with the following developer:—

Pyrogallic acid	2·5 grammes
Citric acid	3·5 ,,
Pure H_2O	284 cub. cents.

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* *Anthony's Photographic Bulletin.*

For a 4¼ by 3¼ inch plate pour into a small graduate or beaker about ten c.c. of the developer, and add two drops of $AgNO_3$, the same as that used in the bath. As the developer is poured on the plate it is allowed to flow back into the beaker again, and this is repeated until the picture is distinctly seen on the surface of the glass by reflected light, when it is washed and fixed as in the wet process. Cyanide of potassium or the hyposulphite of soda may be used. The hypo. is best.

It will now be found that the picture is not so distinctly seen, and a beginner would be tempted to throw it aside as worthless; but, on application of a fresh quantity of the developer, the picture soon grows to the desired intensity, when the plate is washed and placed in the rack to drain. If the tone of the print is too brown, which is often the case when the coffee preservative is used, a weak solution of potassic sulphide may be poured over the surface of the plate, which will not only change the tone, but will clear the picture. In using this pyro. developer, it will be found to turn to a wine colour after it has been flowed over the plate a few times; just as long as it remains this colour it will not fog the plate, but if it begins to turn black or muddy it should be thrown out and a fresh supply taken. The plate that is now developed may be used in the lantern, or prints from this may be made by using it as a negative, and proceeding as with the rock section. To protect the photograph from injury it should be varnished and covered with a thin piece of glass.

I think many minerals could be photographed in this way; of course, only those presenting detail could be worked. Many of the agates would work well; if they were coloured, the prints on the glass could be tinted to imitate them.

PHOTO-PRINTING PLATES.

There are two methods of producing the type plate from the negative, namely, the swelled gelatine, and the dissolved gelatine processes. In the latter process, a thick film of bichromatized gelatine is spread on a sheet of glass, and upon this a sun picture of the negative is made, as in ordinary photographic printing. Wherever the light strikes, which in this case is upon the writing, the gelatine becomes insoluble. The gelatine film is then moistened with cold water, which causes the soluble portions between the lines to swell up and leave the writing sunken. A plaster cast is taken from this, when the writing will appear in a raised line upon the plaster. This cast is then pressed into wax; the wax impression is dusted over with plumbago to give it a metallic conducting surface, and is then placed in a galvanic bath, remaining there from one to three hours, producing an electrotype plate from which the printing is done. It is found, however, that the lines on the plaster cast are not high enough to make a good type, and before pressing the cast into the wax, the spaces between the lines are routed out, or dug out, with a tool, to any required depth. Another method of accomplishing the same result is first to take the wax impression, the workman afterward building up the spaces on the wax, before putting it into the galvanic bath. Still another way is to take a plaster cast from the one already made, which will reverse it, the lines appearing sunken, and from this last cast to make a stereotype plate in type metal, and rout out the spaces in the plate itself from which the printing is done.

The dissolved gelatine or photo-electrotype process is somewhat more simple, and is the reverse of the one just described. The film of gelatine is made very much thicker than before. A light sun picture is taken, leaving sharp outlines. The surface is moistened, and the gelatine washed out, slightly deepening the spaces between the lines. The film or plate of gelatine is then dried, and these depressions are filled with an opaque paste, and the plate is again exposed to the full glare of the sun, by which the chemical effect of the light upon the lines is intensified and deepened, so that the gelatine is hardened to a considerable depth and a gradually increasing breadth, making a firm foundation for the type. The plate is again washed, and the spaces deepened to any extent desired. It is then dried, and can be printed from directly as a type plate, or electrotyped as as before described.

The negative can also be used in connection with the zinc etching process, by which the writing is transferred to a zinc plate, and the spaces between the lines eaten out by acids.—*Franklin Journal.*

HOW TO AVOID RETICULATION.

BY J. C. MILLS, M.D.[*]

Thinking a few words on the carbon process might perhaps be a benefit to some of its workers, I will proceed to give a little of my experience, hoping thereby that some one may be benefited.

As some have been troubled with a reticulation of the film, I would advise such not to use more than one ounce of bichromate of potassa to forty ounces of water, as I am satisfied that a strong solution as some advise (say one ounce to twenty) crystallizes on the tissue, and causes the reticulation.

My plan for waxing the glass I find very much superior to and more simple than that given by Lambert. I dissolve two grains of yellow wax in an ounce of deodorized gasoline 74° gravity, and flow the plate, drain, and then dry with a piece of Canton flannel, rubbing the surface very lightly, and using scarcely more pressure than the weight of the flannel to remove the veiled appearance of the film, which need not take more than half a minute, for a large plate.

I do not use the squeegee to remove the surplus water, or to make the tissue adhere to the glass, but simply lay the tissue on the glass, being careful to exclude all air-bubbles; stand the plate on edge and let drain for five minutes; then proceed with the development.

With the above variations from the printed instructions of Lambert I find the carbon process very simple and easily worked, and think in due time those who are now opposing it will soon become its warmest advocates.

Correspondence.

STEREO TRANSPARENCIES.

Dear Sir,—I shall be glad if you will grant me the necessary space in the next issue of the Photographic News for the following remarks on Mr. Oakes' paper about Mr Breese and his transparencies, a portion of which appeared in last week's issue.

He states, "that no living man besides myself" possesses the whole of Mr. Breese's *modus operandi*. This is a great mistake, and if Mr. Breese led him to believe such was the case, he committed an act of injustice against Mr. Oakes and one or two others, but above all to myself. This I feel anxious to remedy by publishing a few facts.

From the autumn of 1865 till July, 1866, Mr. Breese was in partnership with a gentleman, by name Mr. J. Robinson, to whom he imparted sufficient knowledge to enable that gentleman to undertake the entire management of the printing and combination department, which he did for the time being. As the commercial prospect, and one or two other reasons not worth mentioning here, did not satisfy Mr. Robinson, the partnership was dissolved, and on the condition that the money deposited by him in the affair should be returned, that gentleman consented to be bound down in the sum of one thousand pounds not to devulge nor practise anything appertaining to the business or the processes.

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[*] *Anthony's Photographic Bulletin.*

This probably accounts for his silence and loss of interest in the matter. I have reason for believing he is now living in the vicinity of Birmingham.

Prior to this, a Mr. Fred. Sutton was with Mr. Breese for a short time. After he left he was very much heard of in trying to monger what he knew to many photographers in this country.

Now for myself. I entered Mr. Breese's employ at Acocks Green, as an apprentice, on the 6th of December, 1865, and was with him almost daily until the break up of his home and removal to London in October, 1868. His brother-in-law, Mr. W. Stockil, then took his affairs in hand, and started the concern of Breese and Co., with myself as deputy-manager to Mr. Breese. For the greater part of this time we were quite companions together, and latterly, as Mr. Breese's failing health (softening of the brain) required close attention, he was, to all intents and purposes, under my charge. This state of affairs continued till the death Mr. Stockil, in March, 1872, when the affair of Breese and Co., which, from the failing interest on the part of the public in stereoscopic work, both of the specially good and the inferior class, was not a commercial success, the studio, plant, and effects came under the hammer in the June or July following. It was at this time that, through unpleasantness, the great trial I had with Mr. Breese, and failing health on my part, it became necessary for me to entirely separate myself for a thorough change. Since then I have had neither time nor inclination to take up the subject, and had deferred publication till some transparencies had been produced on my own account to add more force to anything I might have had to say.

While my pen is engaged on this subject, I may as well give my version as to what constitutes (as Mr. Oakes put it) "the pith of the matter." This is the principle on which combination printing for the stereoscope is performed. The principal pieces of apparatus necessary are a binocular copying camera and a good tin or other simple form of lenticular stereoscope open at the bottom. The camera should be fitted with twin lenses, and the usual partitions to divide the two pictures, both in the portion of camera before the lenses, as also that behind. The front of camera carrying lenses must have, besides the rising motion, a means for varying the distance between the lenses, to bring them nearer together, or remove them farther apart, as circumstances may require. A right and left-handed screw motion, worked by a milled head from the side, is most convenient, but rackwork or any other contrivance will do that will fully answer the purpose.

Now for the principle, which I will try to put in as simple a form and in as plain English as such an abstruse subject will allow. If a stereoscopic slide be taken, and the interval measured which separates two corresponding objects in its foreground, one in each half or picture of the slide, then the same be done with two objects in the middle distance, and likewise with two in the extreme distance, it will be found that every measurement increases in length—that of the extreme distance being longer than that of the wide distance, this again longer than that of the foreground, every intermediate grade of distance having an interval proportionate to its position to the points taken for measurement. To make the matter more clear: if a line were drawn from a certain point of a tree stump or other object in the foreground to some definite point in the extreme distance on the one half of a paper stereo, and a similar line were drawn between the corresponding points on the other half, the lines, instead of being parallel, would diverge; the two pictures really diverging from their foregrounds into their distance. To put in any figure, &c., the interval separating the stereo figures would have to be hit exactly with that of the points on which each one was to be placed, or in the stereoscope. Pseudoscopic effect is caused by the exact reverse of the above, the converge instead of diverge.

We will now apply this, and see if we cannot make clear why we see solidity, as well as the other two dimensions, in stereoscopic pictures. It is now well known that, in viewing an object with a pair of eyes, the two retinal impressions only coalesce at one point at a time. The rapidity with which the eyes are moved about from one point to another, the persistence of the optical impressions, or the time they require to become perceptions in the brain, together with judgment acquired by habit, prevent us from seeing all the other parts of the view double, unless we have given ourselves a special training for its observance. To enable us to see any point of a near object, we have to converge the optic axis—or, in homelier language, turn the eyes inwards—till a line drawn through each of their centres intersects at the point veiwed; for a point a little farther off the convergence is lessened, this convergence being more or less, as the point looked at is nearer or farther away. This takes place within the limits of our capacity to judge or appreciate distance.

This is just the performance the eyes go through in the stereoscope in the rapid survey of the two dissimilar images; the near objects being nearer together, as explained above, require greater convergence of the optic axis to unite the two points viewed into one; the more remote ones, being farther apart, require less. This constant alteration in the lines of visible direction, with the accompanying fluctuation in the length of the interval between the centres of the two retinæ, the brain interprets as distance and solidity. Anyone wishing to go into the matter further had better go to the fountain-head—viz., Sir David Brewster's works on the "Stereoscope and Binocular Vision," and Sir Charles Wheatstone's papers published in Philosophical Transactions of the Royal Society.

Now for the application of the above in the construction of a stereoscopic combination picture. Suppose it be required to make a moonlight effect, two stereo. negatives will be necessary, one of the moon only, and a negative, say, of cloud effects taken with the sun in it. If the sun's light were very strong, he would leave a tolerably clear patch in the positive transparency; if he were partially obscured, or his light weak, as in early morning or late in the evening, his limb would be well defined. Either case would not involve much trouble—the latter rather more, perhaps, because the moon would have to be enlarged or reduced to exactly fit the place occupied by the sun's image; but as there is nothing on the moon's negative but its image, the operation is not a very difficult one with the aid of a magnifier. I have omitted to state that the position of the moon on the negative plate should be obtained to correspond as nearly as possible with that of the sun of the cloud negative; by attention to this point much trouble will be saved.

When the negatives have been procured, the next thing will be to put that of the clouds into the front carrier of the copying camera *face outwards*, arrange its position on the focussing screen about 2·6 or 2·7 inches between two similar objects in the respective foreground, focus, make a transparency, dry, and then varnish. Take out cloud negative, and put that of the moon in its place, *face inwards*. The camera-slide, with the shutters opened, holding the transparency, *back inwards*, is to be put into its place in the camera, till the operation of getting the moon right for size and position in it has been performed, which, with the means for enlarging or reducing the camera should afford, and the rising, lateral, and dividing motions of its lens carrying front, should not be very difficult of accomplishment.

When this has been so far completed that it appears near the mark to the unassisted eye, take the stereoscope for the purpose of ascertaining whether the moon is right for distance. Very likely, after all the care and trouble taken, that interesting object will appear almost on the tip of the nose, or an infinite distance in space.

This application of the principle elucidated requires that the moons should be just the distance apart, or perhaps slightly farther, than that of the clouds where they are to appear. If the moon appears too near, separate the lenses slightly. The stereoscope will show, while this is being done, the extraordinary phenomenon of a moon travelling through space at a terrific rate. If too far, move the two lenses nearer together, as a few trials will soon give the moon its proper distance. Focus on the proper screen, try the moon again for distance, &c., fit a print, which must be of medium strength, dry, and coat with a ground glass substitute; gum some narrow strips of thin cardboard round the edges of the surface, and superpose transparency of cloud effect. If the work has been accurately done, the two may be fixed at once; but if, when examined under the stereoscope, the moon be too near, or too far, cut a thin strip out of centre of upper glass, and approach or separate the two parts till the result is satisfactory; fasten securely with strong gum water, then put under slight pressure to dry.

Although this letter is spun out to a great length, I shall not feel words have been wasted if I have succeeded in making the principle of stereoscopic combination printing quite understood. What has been said about the production of a moonlight effect applies to the combination of clouds with landscape, the introduction of figures, &c. Greater care must be taken, though, that both pictures or sides of the stereo slide are identical in size, or another curious effect arises; but more about this, perhaps, another time.

It was really for this principle that, some time during 1866 or 1867, the eminent Paris firm offered Mr. Breese £50 or £100 each—I forget which—for two of his negatives, viz., "The Lonely Shore," and No. 42, "Queen of the Night." The former was not a combination picture, for the condition was that instructions should be given how to print them. I believe the proposal emanated from M. Levy himself.

If the above remarks be not sufficiently satisfactory to Mr. Oakes to induce him to modify his assertion and extricate himself from the false position it places him in, I will undertake to give him in detail the means employed for the production of any of the eighty-six subjects Mr. Breese published (in the last twenty of which, the whole of the practical and most of the thinking work in their production, was performed by myself)—after this fashion: taking the famous sea-gull picture first (No. 27), entitled "What are the Wild Waves Saying?" The sea-view portion of this was taken on the South coast, near Bridport; the gulls were stuffed ones, and, with their wings outstretched, were strung up and photographed while lightly in motion in the garden; the clouds were taken from a bed-room window in Acock's Green, the two latter negatives being combined and placed over the sea in the copying camera. Or take another (No. 64)—the lark picture. The fern bank was taken from a negative of Grassmere Lake, the clouds from the same neighbourhood as the ones above-mentioned, the lark was sketched on a piece of fine ground glass, from this it was copied and combined with the above. Then he, to cite the quotation from Shakespeare upon the finished picture,

"At Heaven's gate sings."

I will give one more instance (No. 76)—"The Robin Redbreast"—and will commence from the photographing of the drawing-room interior, with snow effect outside the window. This was obtained in summer, the exposure being half an hour with a small stop. So much for photographic truth. The robin was a papier-maché one, purchased at Mrs. Clark's, Upper Sydenham, which, when his metal claws had been twisted round a suitably snowed twig, was ready to be photographed, and to be put to sing outside of the window.

If you can find space, I may, as opportunities arise,* send some details respecting the chemical manipulation, the production of atmospheric effect by shades with softened edges, "wafting," and by the use of a weak solution of cyanide and iodine, the methods for obtaining coloured glasses, two colours upon one glass, &c. I may also have something to say about photographing clouds, moons, &c.

Mr. Oakes' description of Mr. Breese's method of colouring the lustre picture is not correct: the original work was not performed in such a haphazard manner. As Mr. Breese well knew that, in viewing prisms, of which a "lustre" is composed, every slight change in the angle of view must of necessity produce a different colour, while the laws relating to the dispersion of light remain as they are—he, to ensure the representation of the colours being natural, in painting the slides, copied the lustre while viewing it from the point from which it was photographed, that object remaining on the mantel-piece with the conditions of light the same as when it was taken; he then looked at it alternately with the right and left eye, putting a touch of colour on the right picture, the same as that he saw in the lustre with that eye, doing likewise with the left eye and its picture, till the slide was finished. This, of course, accounts for the over-lapping of the colours arising from the change of angle being so small. The colours used were of the transparent kind—such as Italian yellow, Prussian blue, crimson lake, emerald-green, &c., thoroughly ground in turpentine, and worked in a vehicle of copal varnish.

Just a few words on another point. I wish to enter a protest against the use of the expression which is becoming so hackneyed in photographic literature. Mr. Oates has given its substance in the following words:—"I should not be at all surprised if some one crops up in future who knew how it was done all along." Much has been said about raising the social status of photographers, but how can this be expected while one brother of the craft does not scruple to impute falsehood and meanness of a most despicable description to another?

Such, in my opinion, outsiders would take as the meaning of the words quoted. If I, from illness or any other cause had not seen Mr. Oakes' paper, how unjust the application of those words would be to me when I made myself heard on the subject of transparencies!

While we are constantly hearing of two or more investigators arriving at the same conclusion independently of one another, almost by the same means, it behoves us to be very careful how we suspect another of appropriating our ideas, or to make the assertion that we stand alone in any sphere of thought.—I am, dear sir, faithfully yours, John Harmer.

Wick, near Arundel, January 21st.

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* We shall have pleasure in hearing further from our correspondent.

Talk in the Studio.

Frederick Gutekunst, of Philadelphia, photographer, has been distinguished as the recipient of the Cross of the Knights of the Austrian Order of Franz-Joseph, conferred by the Emperor of Austria on Mr. G., on account of the excellence of his productions in photographic art. Distinctions are well bestowed when made for such reasons as have brought decoration to Mr. Gutekunst.—*Public Ledger*

"Christmas and Easter."—Reproductions, by the permanent autotype process, of the two pictures which have for some time past been on view at the art gallery of Mr. Arthur Lucas, in Duke Street, are now published, the resemblance to the original works, by J. K. Thomson, being rendered closer by the addition of skilful colouring. The subjects are purely ideal, representing severally "The First Christmas" and "The First Easter Dawn." Angels, in a stream of glorious light, are waking the shepherds on the morn which ushered in the reign of Christianity; and, in the companion work, two of these heavenly messengers, floating in mid air, look sorrowfully towards the early light which breaks beyond the Hill of Calvary, on which are seen the three distant crosses, dark against the sky.—*Telegraph.*

Note on the Action of Light upon Solution of Oxalic Acid—By Arthur Downes, M.D., and Thomas P. Blunt, M.A. Oxon, F.C.S.—In the course of an investigation into the physiological action of light upon minute organisms, the results of which are embodied in a paper read before the Royal Society on the 6th inst., we observe that oxalic acid in a solution of decinormal strength is entirely destroyed when freely exposed to sunlight for some time; a similar solution under parallel conditions, with one exception—that the tube containing it was encased in an opaque material—remaining to all appearance entirely unchanged. The destruction of the oxalic acid in the isolated tube was so complete at the end of two months, when the solution was examined, that it had no action on litmus-paper, and gave no precipitate with calcium chloride; the reaction with potassium permanganate was so slight as to be scarcely appreciable. The nature of the change—whether it be the result of oxidation or of pure disintegration of the molecule—will form the subject of a future inquiry, but we think the fact itself is of sufficient interest for chemists to justify the present communication. One obvious inference of a practical character is, that analysts who still use oxalic acid as a standard should protect the solution from light.—*Chemical News.*

The Electric Light.—A special division of the Paris International Exhibition will be devoted to electricity, so that all the systems of electric lighting may be tested comparatively. The electric light continues to create the greatest interest in Paris. The experiments which we mentioned some time ago have been conducted during forty consecutive days at the Lyons railway station. A force of about forty horse power is sufficient to keep going twenty-eight electric lamps, each of which gives a light equal to eighty gas lamps, and works with regularity for ten and a half hours. The effect is splendid, the whole of the station, except the waiting room, being lighted à giorno. The question of economy, however, is not yet settled. It is not known whether the company will agree to pay a somewhat higher price in order to multiply the power of its illumination. These experiments have been tried on Lontain's system, a modification of Wilde's and Siemen's principle. M. Lontain has contrived to send the current generated by an ordinary Wilde's machine into an electro-magnetic engine called a distributer. The central part being strongly magnetized by the current from a Wilde's machine, a number of electro-magnets are influenced by its rapid rotation, and in each of these an induction current is generated. These induction currents are powerful enough to feed three electric lamps; and as there are two series of twelve magnets, a single machine could, theoretically, feed seventy-two lamps. Actually, however, it feeds only twenty-eight. Lontain uses a new regulator, which works very well by the dilatation of a small silver wire. By its dilatation this part of the apparatus works a lever system, and brings the carbon electrodes into contact. The French Northern Railway has purchased a number of Gramme magneto-electric machines. They intend to use them at their goods terminus and stores.—*Nature.*

More News From the Sun.—We noted recently the fact of Dr. Janssen having obtained some exceedingly large and fine photographs of the sun, and that it was probable that by means of the facility which these afforded for observing the solar surface, new deductions concerning the nature of the latter would probably be reached. Dr. Janssen's photographs are some 15 inches in diameter, and show details of the mottling or willow leaf on the sun of less than one second of arc. By examining these points, Dr. Janssen has recently found that the surface of the photosphere has not a constitution uniform in all its parts, but that it is divided into a series of figures more or less distant from each other, and presenting a peculiar constitution. They have contours more or less rounded, often very rectilinear, and resembling polygons. Their dimensions are variable, and they sometimes attain a minute or more in diameter. In describing the figures in *Nature*, Mr. J. Norman Lockyer says, that "while in the intervals between them the grains are clear, though of variable size, in the interior the grains are as if half effaced; for the most part, indeed, they have disappeared to make way for trains of matter which have replaced the granulations. Everything indicates that in these spaces, as in the penumbræ of spots, the photospheric matter is submitted to violent movements, which have confused the granular elements. Mr. Lockyer considers the discovery as confirmatory of his opinion that sun spots are an index and not a measure of solar activity, and that their absence indicates a reduction, not a cessation, of the sun's energy. Dr. Janssen also points out that this fact throws light upon the forms of solar activity, and shows that that activity, in the photosphere, is always very great, although no spot appears on its surface.

Novel Method of Preparing Oxygen.—The author finds that oxygen may be very readily obtained even at common temperatures by the mutual reaction of two oxygenated compounds formed of several atoms of oxygen, such as hypochlorate of lime and peroxide of barium. These facts prove, he considers, that the oxygen is produced by the neutralization of the opposite electric polarities of the oxygen in one of the compounds and that in the other.—*Sylvester Zinno, in Les Mondes.*

To Correspondents.

Plate Cleaner.—In our own experience, we have found the trouble and risk of cleaning and using old glasses which had been used for negatives was greater than the value of the glass. Nitric acid is one of the best agents to use. Bichromate of potash, sulphuric acid, and water, form a good detergent solution; but, as a rule, we use the glass for some other purpose, such as glazing pit-lights for the garden, or any purpose but taking the negatives. New glass requires, as a rule, very little cleaning. A little alcohol and rotten stone will serve well.

J. B. S. wishes to know the best way to make transparencies for the magic lantern. The question is not easy to answer, as much depends upon the skill and experience of the person making the transparencies. We should personally prefer to produce them by the carbon process. Nothing can be more simple. Get a suitable tissue; sensitize, expose, transfer to the glass, develop, and wash. If our correspondent is not familiar with the carbon process, he may produce his transparencies very easily on dry plates. If he is familiar only with the wet process, he can, by the aid of a copying-camera, produce excellent transparencies on wet plates. We cannot describe the operations in detail in this column; but he will find many articles on the subject in back volumes, and in our various Year-Books. In that for 1868, full details of producing transparencies by the wet process are given.

R. M.—Common sheet-glass, known in the trade, we believe, as Belgium sheet, answers perfectly well. The colourless, or white glass, is very costly, and soon turns yellow. The purple or mauve tint to which you refer is not produced intentionally; it is the result of the action of light on glass containing an excess of manganese. For large panes in a studio, what is termed twenty-one-ounce glass is best, and is quite strong enough. It is wise to keep the glass clean inside and outside.

G. D.—Photo-lithography will not produce impressions in photographic half-tones; the gradation will only be mechanical, consisting of lines, hatching, or stippling. Photo-collographic processes will yield true half-tones, as will also the Woodbury process

A Little One must acquire habits of precision. Haphazard proceedings will rarely lead to success in photography. Your teacher who took a handful of crystals and added water at random is a dangerous teacher. It is just as easy to weigh and measure as to guess. 2. You may succeed moderately well with portraiture, in the open air. Choose a place where two walls form a corner exposed to the north, and if you can stretch a sheet or table-cloth as a screen over-head to remove the effect of direct top-light, you may secure very fairly-lighted portraits. The exposure will be short.

F. D.—We have reviewed and repeatedly quoted from, within the last twelve months, a very useful work of the kind—"Carver and Gilder's Guide, and Frame Maker's Companion," published by Kent and Co., Paternoster Row, price half a crown.

South Devon.—In using marine glue we have always heated it at the flame of gas or of a candle. It requires a greater heat than boiling water to melt it for use. The glass or other material to be joined should be made hot before the marine glue is applied. We do not think having been laid about for some time will have injured it for use.

Hugh Walker.—Portraits of the size you mention can be taken. You would require a portrait or group lens of about sixteen inches focus. But it is probable the camera is intended for copying and enlarging purposes, considering the extent to which it expands.

J. F. M.—The dry powder from old developer and washings most probably consists of reduced silver and iron. You cannot readily convert the powder into chloride of silver. Add a little solution of sulphate of iron, and boil in a flask or evaporating dish, so as to reduce all the silver; then wash well with dilute sulphuric acid, to remove iron, and the silver, in a black metallic powder, will remain.

C. R. P. Vernon.—Thanks. In our next.

The Photographic News, February 1, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Death of Becquerel and Regnault—M. Warnerke in Russia and Belgium: Award to Him of a Gold Medal—M. Boivin's Method of Removing Films by Electricity—Photo-Astronomical Observatories.

The Death of Becquerel and Regnault.—Two names that have long been familiar to photographers occur in the obituary of last month. They are those of Becquerel and Regnault, both of whom were members of the Institute of France. Regnault, a chemist long associated with the famous *Ecole Polytechnique*, of Paris, was for some years President of the French Photographic Society. He presided over the deliberations of that body regularly at their fortnightly meetings, and did much towards aiding, by his valuable advice, the various investigations undertaken by members and committees. Regnault was well known to chemists in this country, and was nominated a foreign member of our Royal Society, from which he received both the Copley and Rumford medals. One of Regnault's appointments was that of director of the manufactory of porcelain at Sevres. Becquerel was nearly ninety when he died on the 19th of last month. His name is familiar to all who are cognisant of the early history of photography. He was certainly one of the most learned physicists of our time, and his investigations in electro-chemistry are well known to every student of natural philosophy. The action of the spectrum and of colours generally upon a sensitive photographic film was the principal subject of investigation with Becquerel, and he it was who made the first step towards photographing in colours. A gay-plumaged parrot was secured by Becquerel upon a photographic plate, and this result led the way to the other interesting experiments in the same direction by Niepce de St. Victor, who, it may be remembered, secured a whole series of photographs of coloured dolls upon the violet sub-chloride of silver, which are still in existence at the present day. Becquerel had been a member of the Academy of Sciences half a century, having been elected to that body in 1829, and he, too, was honoured by our Royal Society with a medal. Not only as a scientific man, however, was Becquerel noted. He was an engineer officer early in life, and fought against us in the Peninsular war. He took part in several of the sieges under Marshal Suchet.

M. Warnerke in Russia and Belgium: Award to Him of a Gold Medal.—M. Leon Warnerke has been visiting the Continent, and travelled as far as St. Petersburg, where the principal Russian organ in that metropolis, the *Golos*, sings his praises. Notwithstanding the all-absorbent topic, the war, the *Golos* finds room for a laudatory article upon M. Warnerke's tissue and roller dark-slides, which the State Paper Office of St. Petersburg is experimenting with. On his way to the Russian capital, M. Warnerke travelled through Belgium, and was invited by the Royal Photographic Society of that State to give a practical demonstration before the members of his emulsion process. The issue of this has just appeared in the organ of the Society, the *Bulletin Belge de la Photographie.* Under the heading of *Concours International de l'Association Belge de Photographie*, it is stated that the gold medal of five hundred francs offered for the best dry collodion process, has been awarded to M. Warnerke, of London. Photographers in this country will not fail to be pleased at this news, for M. Warnerke's name as a progressive photographer has been familiar to us all during the past few years. Perhaps, on the occasion of the next competition of the kind, it would be well not to restrict candidates to collodion processes, but to include dry processes of all kinds, since, in these days of emulsion processes, we may find other vehicles quite as convenient as the one mentioned.

M. Boivin's Method of Removing Films by Electricity.—M. Boivin has lately called attention to a circumstance which may be of considerable importance to photographers. It is the application of electricity in the matter of stripping photographic films from glass plates. Photographers know full well that there is hardly any subtance so electric in its nature as a collodion film, and a dry film may be made to adhere firmly to a glass surface if it is simply stroked by the hand to excite it electrically. M. Boivin believes that the only adhesion of a collodion film to glass in the ordinary way is due to its peculiar electric state, and it is when the electric condition is destroyed that the film is repelled so thoroughly that it may be lifted from the plate without difficulty. We are ready to go a great way with M. Boivin, and admit that electricity does play a very great part in the matter of adhesion, and that under some circumstances it is only electricity which secures adhesion—for instance, in the case of a Warnerke film, which is of an exceedingly electric nature. A film of this kind in a perfectly dry condition will, when excited, remain so firmly attached that it is only peeled off the glass with difficulty, and clings to one's hands and around one's fingers most tenaciously. When charged, however, with positive electricity the film comes from the glass immediately, and one has no difficulty in getting it to leave the plate. It loses all tendency to cling, and may be lifted up at once. M. Boivin tells us that any negative—unvarnished, we presume—may be treated in the same way, and this is certainly good news, for all photographers know how troublesome it is sometimes to effect a separation. A coating of gelatine is generally necessary to increase the consistence of the film, and when the gelatine is dry, then the film will possibly leave as soon as it is cut round the margins with a sharp knife. Prior soaking of the collodion in acidified water facilitates matters, but, under any circumstances, the task is not an easy one to perform. M. Boivin tells us that if we will simply cut round the edges with a knife, and then charge the film first with one kind of electricity and then with another, the collodion image will leave the glass without further trouble. Cementing with albumen or varnish should not, of course, be resorted to under the circumstances.

Photo-Astronomical Observatories.—Great Britain will fall behind other nations in its astronomical work, unless we make an effort in this country. For years past we have been in the van in respect to our observatories, and the solar photographs daily taken at Kew (that is, when there is a sun to be seen) have furnished other countries with data which they did not possess. The solar pictures in question are not very wonderful, judged by the standard of the present day, but as they were the first of their kind, and recorded very accurately the position and size of the sun-spots, as well as other striking phenomena, the importance of the records cannot be impugned for a moment. In fact, one circumstance was clearly established by these pictures alone—namely, that the formation of the phenomena could be watched, their recurrence accurately observed, and the changes in their dimensions accurately noted. In a word, the history of sun-spots and their accurate study dates only from the time when photographs of the solar sphere were first taken. "Sun-spots and Famines," about which Mr. Proctor and Mr. Lockyer have lately written and speculated, is a subject which has emanated from a study of the photographs taken day after day, and though it is too early as yet to place great credence in the speculations that have recently been made on this score, there cannot be a doubt that a close study of photographic records of the sun will in time furnish very valuable information. But it will be necessary for us to take steps to obtain better photo-astronomical observatories than we now possess. The German Government have already commenced a fine establishment in the neighbourhood of Berlin, and the Paris Photographic Observatory at Meudon, which is under the able direction of M. Janssen, has already become famous. It behoves us not to be behindhand in the race of progress.

THE PHOTO-ENGRAVING COMPANY OF NEW YORK.*

The earliest attempts to produce engraved plates by the aid of light appear to have been made in France about the year 1813, by Nicéphore Nièpce. He was prosecuting experiments in lithography, then in its infancy, when he conceived the idea of transferring his drawings on to the lithographic stone by the aid of light. While thus engaged it occurred to him that he might produce engraved plates by the same means, and even render permanent the image shown in the camera-obscura. After continuing his experiments for more than fifteen years, he associated himself with Mons. Daguerre, who had also spent several years in similar investigations. In 1833 Nièpce died, and a year or two later Daguerre invented his method of developing the latent image impressed by light on an iodized silver plate, by means of the vapour of quicksilver.

Nièpce's method of heliography, as he called it, consisted in coating a metallic plate with a film of asphaltum dissolved in oil of lavender. Over this plate he laid a print or drawing, which had been rendered transparent by the application of oil, and then exposed it to the sun. The dark lines of the drawing protected portions of the asphaltum from the light, while the unprotected parts were acted upon and became insoluble. The plate was then washed with turpentine, which removed the asphaltum where the light had not acted, but left the remainder undisturbed. The bare metal, thus exposed, was then etched with an acid, and an engraving produced. But the results thus obtained were very imperfect, and practically useless.

There are quite a number of different processes which may be classed under the general heading of photo-mechanical printing, which it is not deemed necessary to review in detail here, as the degree of success attained has been frequently small, especially when the particular system was subjected to the rapid and comparatively careless manipulation incident to the use of the fast newspaper press. It may be stated, however, that nearly all of these processes depend upon the use of bichromate of potash with which is associated gelatine or similar organic matter. Mungo Ponton, in 1839, first discovered the sensitiveness to light of a sheet of paper treated with bichromate; in the following year Becquerel found that the sizing of the paper played an important part in the change, and in 1853 Mr. Fox Talbot discovered and utilized the insolubility of gelatine exposed to light in the presence of bichromate. In 1854 Paul Pretsch discovered and utilized the quality which such exposed gelatine possesses of not swelling in water. On Pretsch's discovery are based the gelatine processes that have attained most notoriety, and that have excited among experimenters the largest expectations of success, as follows: A glass or metallic plate is coated with a mixture of gelatine and bichromate of potash, which is allowed to dry and afterwards is exposed to the sun through a photographic negative. It is then immersed in cold water, when the parts protected from the light by the negative rapidly swell, while the parts not so protected are hardened and do not swell to the same extent. This gelatine surface then becomes the matrix from which, through intermediate steps, the final plate for printing is formed. The main difficulty encountered is that the surface of the matrix is made up of unequally swelled lines, and these, as reproduced, come out without sharpness—uneven and clumsy. Hence when placed upon the press, the plates are found incapable of yielding a clean and bright impression. The other process differs from the foregoing in that instead of swelling the soft parts they are wholly washed out. The difficulty here is that the water affects the insoluble portions, so that the lines are rendered rounded. Broad lines are also likely to become concave and to require subsequent pumicing to level them, a proceeding which is fatal to their delicacy and fineness of definition.

These processes, as already stated, constitute the foundation, but the results they yield are materially affected by the different minor modifications which individual experimenters have introduced, and which, as a rule, are kept secret and not patented. The Moss process arose from an effort to avoid the difficulties above referred to. It is a combination of certain elements of other processes, for the purpose of securing completeness and delicacy of detail, in connection with all desirable depth and smoothness of lines. Of the two prominent photo-engraving concerns in this city, one prepares its plates of zinc, and turns them out ready for the press without the further necessity of any hand routing or other tool work; the other produces fine plates in type metal, and finishes by hand. In both cases, however, hand work is involved, as in that first mentioned the necessary sharpening of the lines is done on the negative.

The plates by the Photo-Engraving Company, of this city, are made of type metal by stereotyping, and are hand finished. The first operation is to prepare the drawing which is to be reproduced. To do this successfully it is necessary that the picture should be formed of clean, sharp, and very black lines. Flat tints and washes, or blurred shadows, cannot be photo-engraved unless they are first translated into lines. Where an engraving is to represent a piece of machinery, for example, a photograph of the object is taken, but is not fixed in the gold bath. From this print the artist obtains his outline in black ink, and this done, he obliterates the photograph by corrosive sublimate. He has then an accurate outline, which he proceeds to fill in with a shading, &c., of pen lines. It is usual to make the drawing somewhat larger than the engraving is to be, in order that by the reduction the lines of the latter may be rendered finer.

Next ensues the photographing. Here a negative of the drawing is prepared, from which, by several intermediate steps, a mould is made. The picture during this process is reduced or enlarged as desired, the reduction being only limited by the capability of the resulting block to yield a clear impression under the conditions of printing to which it is to be subjected. Thus a finely reduced engraving would soon fill with ink, and produce a disagreeable and blurred impression on a rapid press, while, on a slow book-press, and on fine smooth paper, the same engraving would give excellent prints.

The cameras used are exceedingly large, thus giving clear and very well-defined pictures; while the entire apparatus of both camera and retaining device for the picture to be photographed is suspended from the ceiling of the room by a single rope. The advantage of this last arrangement is that it prevents independent accidental movements of camera and object. Should one or the other move even the merest fraction of an inch—and this might easily be caused by the jarring of the building through the passage of heavy vehicles in the street—it is evident that the accuracy of the photograph would be impaired; but, so long as both camera and object must move together, if at all, their relative positions always remain unaltered. It is by such nice relative refinements as this that the clear, sharp work is produced by the Photo-Engraving Company.

After the photo-plate is finished—and this is a work requiring skill and scrupulous care—it is copied in metal, and this copy forms the engraving or block that is used on the printing press. The next process is the trimming of the plates, and this is done by skilled engravers, who, with the burin, render the lines sharp and clear, and cut away metal in the high lights to intensify the same. This work is of course entirely auxiliary to the photo-engraving process, but it has the advantage of rendering the engravings produced by the Photo-engraving Company from drawings or other engravings almost as perfect as the originals. Very often it is found necessary to reproduce a picture which is poor, but the only one attainable giving the desired representation. In such case the photo-engraving is an accurate reproduction, faults and all, but the latter are speedily modified by the skill of the finishing engraver.

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* *Scientific American.*

The plate of metal is now mounted on a block, type high, and no further treatment is necessary to adapt it for the printing press. Sometimes where a large number of impressions are to be taken, the surface is coated with a thin film of copper by electro-metallurgy, or an electrotype is taken from the plate the same as from a wood-cut. Fine line steel engravings are duplicated with wonderful accuracy, so that instead of paying ten or fifteen dollars for a choice picture, the lover of art may now obtain the same at a tenth the price. The process used by the Photo-engraving Company is due to the ingenuity of Mr. John C. Moss, who has laboured constantly in inventing and improving the same for nearly twenty years. The exact means whereby the excellent results we have noted are obtained are kept secret, but this is of no importance to the public, so long as such high grade work can be uniformly produced at a cost less than that of wood engraving.

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COLLODIONISED TISSUE.*

Already it has been several times proposed in the *Archiv* to overcome various defects in the carbon process by coating the bichromated gelatine tissue with collodion, or dipping the tissue bodily into this liquid. According to Herr H. Norden there is nothing to fear from reticulation or grain in the tissue under these circumstances.

The question whether the tissue purchased in commerce could not be advantageously prepared already with this coating of collodion, is one which should not be overlooked. Were this the case there would be no longer any necessity for collodionising glass plates, a circumstance which would materially simplify printing in pigments. Herr R. Jastrzembski has recently pointed out the advantages which would accrue from such a course.

In the first place, as just pointed out, the washing of the plates and the collodionising of them would at once be spared. The finished picture is easily removed from the glass surface on which it has been developed. Secondly, there is no chance of any creasing of the tissue during development, by reason of the same having previously been of a horny character, so long as a film of collodion stretches over the surface. Of this one may easily convince oneself by taking an old piece of tissue and covering it with collodion. You will be surprised how cleanly and delicately the picture is developed, whilst the same tissue treated in the ordinary manner, without this method, will fail to give any satisfactory results at all. So that if the precautionary measure of collodionising the tissue were taken, nothing is to be feared for from summer heat and hot dry weather.

Herr Jastrzembski further says:—Of a number of plans which I tried, I found the following to be the best:—A piece of tissue of certain size is stretched, by means of drawing pins, upon a board, and then coated with collodion in the ordinary way, as if it were a glass plate with collodion containing one and a half per cent. of pyroxyline in solution. As soon as the collodion is half set it is taken from the board, quickly immersed in water, and moved to and fro until all signs of greasiness have disappeared, when it is placed to dry upon a slanting board. When perfectly dry the tissue is rubbed over with the well known wax and turpentine mixture, so that very little of this remains behind. This film must be quite dry before the tissue is used any more. Prepared in this way, the tissue may be made use of the next day, and will, of course, remain in good condition in an unsensitized condition for a long while. Tissue thus prepared could be very well manufactured for commercial purposes.

The manipulations are as follows. The tissue thus prepared is put into a sensitizing bath composed of—

Bichromate of potash	4 parts
Carbonate of soda	1 part
Water	120 parts

The tissue is immersed in this bath for a period of three minutes; it is then dried and printed in the ordinary manner. To develop, it is put first of all into cold water, and placed upon a clean glass plate under water. Plate and tissue are lifted out together, and the latter is rubbed down with a strip of cardboard instead of rubber squeegee. It is well to place the plates ready for developing one upon the other with a sheet of bibulous paper between, and having weighted them to allow them to remain in this state for a quarter or half-an-hour—longer than this rather than shorter.

In actual development, it is best to begin at once with very warm water; the paper backing must not, however, be removed until, when touched with the finger, it slides easily from the glass plate; it is then lifted with the utmost care.

After complete development the image is put into a five per cent. alum solution for half-an-hour, when it is rinsed with cold water and dried. The transfer of the tissue takes place in the ordinary way; artificial drying should not be resorted to.

The retouching of the pictures is best done with some of the gelatinous pigment softened in lukewarm water and treated with a few drops of acetic acid. Any pictures which require much retouching, or are deficient in brilliancy, may be treated with a thin coating of good varnish, which increases the gloss of the image and protects it also from moisture. Only care must be taken to employ but such varnishes which can be used very thin and sufficiently hard to withstand scratching. Varnish will be found to adhere far better to pictures of this kind.

It is by no means imperative to employ collodion for the coating of pigmented tissue; there are substitutes on the one hand cheaper, and on the other more easy of application. Indeed, manufacturers have already taken the matter into consideration, and tissues are coming into the market the surface of which is covered with a porous colloid film, which will render the pigmented material especially valuable for employment in hot climates.

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MY SUCCESS WITH EMULSION WORK.

BY A FILTER.*

I began my experiments with emulsion partly because it requires less invesment, and partly because it was something new, and I have yet no desire to undertake bath work. I believe that with an emulsion well made, a proper developer, and careful attention to details, success is more certain than with the bath. The emulsions which I find to be the most satisfactory are from two formulæ, one of which is taken from Professor Towler's "Dry-plate Photography;" the other was taken from one of the photographic magazines. The details and some of the formulæ have been altered, or such others submitted as were more simple, or gave better results.

I have found no difficulty in making my own emulsions, and by making them myself I can use them more intelligently, knowing their composition, &c. In making an emulsion, I dissolve the bromides in the least alcohol possible, and when all is dissolved add the ether and cotton; in No. 2 the hydrochloric acid is added to the bromide solution before the cotton. The silver is always to be dissolved with heat, in as much alcohol as can be reserved from the formula; and when dissolved, it is necessary to add it to the bromized collodion immediately, to avoid recrystallization; the emulsion is then shaken hard, and kept in the dark. I use 5 by 8 glass with corners and edges ground, and clean the plates by putting in lye, then rinsing and coating with prepared chalk and water; when dry, rub off with a clean cloth, and coat with dilute albumen, and stand them away to dry. The best substratum for all purposes is albumen and water, with a few drops of ammonia to keep it. The preservative given does not require anything to keep it; it keeps well even in hot weather. After being coated with emulsion, the plate is placed in clean water until all greasiness disappears, then it is rinsed, and if required to keep for more than half an hour, it is flowed with the preservative, drained, and placed in the changing box. If required for immediate use as a wet plate, the preservative is omitted, and the plate will work nearly as quick as a bath plate. The film, being always moist, will not bear rough usage, but is more sensitive.

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* *Photographisches Archiv.*

* *Philadelphia Photographer.*

The length of exposure, depending on the age of the plate, the light, and the lens, will be from thirty seconds to fifteen minutes. By the addition of three to six drops of strong solution of iron bromide to the ounce of emulsion, I have been able to get a good negative out of doors in two seconds with good light. The emulsion so prepared will not retain its extra sensitiveness longer than a few hours.

Upon the developer depends the success of emulsions, which naturally lack intensity, as all do more or less. The one given is the best of the many which I have tried; it gives strength, and is regular in its action. Instead of trying to use pyro in solution, it is better to have it weighed out in "powders" of one or two grains each, which is sufficient for a 5 by 8 plate. The soda carbonate should be fresh, not the effloresced article usually offered, and the silver and pyro should not be discoloured; the purity of the chemicals is an important part. To develop a plate, it is placed in clean water until the film is evenly wet, then rinsed and flowed with the developer, which is poured off when the image begins to appear; the plate is kept moving, and, when fully developed, is washed and fixed; or, if irregular action should begin, it is to be washed with acetic acid and water, then fixed, and thoroughly washed, and let dry. When a plate has become dry it should be flowed with alcohol before re-wetting, to avoid blisters; then, after washing, it may be intensified with acetic acid, pyro and silver used rather weak, and quickly flowed. Beware of keeping it on too long: if once is not enough, make a new mix, and apply again, &c. The use of alcohol or sugar in the developer causes the film to look pink, reddish, or purple by transmitted light, and is of no particular advantage. The bromide of iron spoken of was formed by adding five grains of iron sulphate to seven to nine grains of potass. bromide in solution; this may not form iron bromide proper, but it is mixed in the proper proportions, and does what is required of it.

The following are formulæ which have given me the best satisfaction, with the most certainty and least trouble:—

EMULSIONS.

No. 1.

Ether	2 ounces
Alcohol	2 ,,
Cotton	24 grains
Ammonium bromide	3 ,,
Cadmium bromide	24 ,,
Ag.NO$_3$ (nitrate of silver)	48 ,,

No. 2.

Ether	2½ ounces
Alcohol	3 ,,
Cotton	20 grains
Cadmium bromide	40 ,,
Hydrochloric acid	8 drops
Ag.NO$_3$ (nitrate of silver)	80 grains

No. 1 gives intensity; No. 2 detail. They may be mixed to obtain the happy medium. No. 1 is improved by more ether.

DEVELOPER.

Stock Solution No. 1.

Water	4 ounces
Soda carbonate	½ ounce
Ammonium bromide	10 grains

No. 2.

Water	1 ounce
Pyrogallic acid	40 grains.

Accelerator No. 3.

Water	½ ounce
Ammonia, concentrated	½ ,,
Ammonium bromide	20 grains.

The accelerator is added to No. 1 (six or eight drops) before No. 2, when ready to use, but is not often required.

PRESERVATIVE (*Stock Solution*).

Water	3 ounces
Albumen	½ ounce
Glycerine	1 ,,

The developer is Newton's alkaline, and to it I give most of the credit of my success with emulsion.

In conclusion, I would say that nothing new has been told, it having been my object to give a sort of compilation which forms a simple and reasonably certain method of working emulsion, dry or wet.

ON AUGMENTING THE SENSITIVENESS OF DRY PLATES.

BY ERNEST BOIVIN.*

In a preceding number of this journal I had the honour of communicating an easy method of augmenting the sensitiveness of dry plates by employing iodine. I have now found that another method furnishes equally good results, especially in the case of Taupenot and other similar plates.

The method I allude to is as follows:—The preparation of the plate is conducted in the ordinary manner, except that the sensitizing of it is undertaken in an aceto-nitrate of silver bath, and the immersion of the plate therein must not exceed more than from thirty seconds to a minute. As soon as the plate comes out of the silver solution, it is washed in a dish of pure water, and subsequently under a tap. The film is permitted to drain, and is then covered with the undermentioned solution, which acts as a sensitizer, and preserves all the qualities of the iodide of silver:—

Water	100 cub. cents.
Phosphate of soda	2 grammes
Pyrogallic acid	0·2 decigrammes

The film is then permitted to dry spontaneously. Equally good results are secured by suppressing the pyrogallic acid, except that the plates are not so sensitive.

The time of exposure may be considered to be twice that required for a good wet collodion plate.

To develop, the exposed plate is washed, or immersed at once without washing, in a bath made up in the manner following:—

Water	250 cub. cents.
Gallic acid	1 gramme
Pyrogallic acid	0·3 decigrammes
Acetic acid	3 cub. cents.
Alcohol	3 ,,

To the above are added a few drops of a solution of phosphate of soda (five per cent. strength), if such addition is deemed necessary; after immersion for some minutes the plate is withdrawn, and to the liquid is added just a trace of silver solution made up of

Water	20 cub. cents.
Nitrate of silver	1 gramme
Acetate of lead	1 ,,
Acetic acid	3 drops

An abundant precipitate is at first formed; but one portion is soluble. After twenty-four hours you filter, and keep ready for use. This solution, added to the developer, will be found to accelerate the action of the latter wonderfully.

As soon as the details have appeared, the amount of lead-silver solution is augmented, and some drops of acetic acid are added. In a little while the cliché will attain to the requisite vigour. The other manipulations are carried on in the ordinary manner.

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* *Moniteur de la Photographie.*

This method of proceeding secures to the plates very considerable sensitiveness, and allows the films to be preserved for a long time. Moreover, the quality of the clichés is much improved; they are very clear, harmonious, with no great contrasts, and they exhibit a great deal of detail in the shadows, as, for instance, in foliage, verdure, &c. The development of the plates is more rapid, and the prints produced from them are finer than when the negatives are prepared in the ordinary way.

I was led to employing phosphate of soda, having learnt to know the valuable properties of phosphate of silver. The washing of the plate after sensitising does not need to be very perfect; the phosphate of soda is destined to transform into phosphate of silver the last traces of nitrate escaped in the washing. Moreover, phosphate of silver is of the same yellow colour as iodide of silver, and has the effect of preventing marble markings and irradiation coming from light striking the reverse of the glass plate. Theoretically, the phosphate salts remove the sensitiveness of the sensitive films; but practically the reverse is the case, and I have found that, as soon as I had recourse to phosphate of soda, I was enabled to reduce considerably the exposure, and augment the purity and transparency of my negatives.

SUBSTITUTES FOR COLLODION IN DEVELOPMENT OF CARBON PRINTS.

BY M. LAMY.*

In carbon printing, a glass surface employed as provisional support gives more delicate and finer images than any other. It must be covered, however, with a film of some kind to render adherence of the tissue perfect during development, and to allow of its removal subsequently in the transfer process.

With wax as a coating, very great skill indeed is necessary to carry out the development without any mishap. With collodion the work is very easily performed, but then collodion is an expensive material, one litre of the material being required to cover fifty glass plates twenty-four by thirty centimetres. Moreover, collodionizing the plates and washing them take up time, and I have found that an active man requires eight hours to coat fifty plates of the size above mentioned, and to wash them thoroughly. It is therefore impossible to employ this system in the case of an extensive printing establishment.

But I have been enabled to devise several bodies fulfilling the same object as collodion, and yet costing far less, while their application is not so time-taking. By their aid I have been enabled to coat 480 plates, twenty-four by thirty centimetres, in eight hours, the resulting pictures having all the delicacy and glaze which glass-developed carbon prints always possess. These substances, too, cost but a few centimes per litre.

The mixtures seemed to me so important that I did not tarry to make their nature known, so that other carbon printers might share the knowledge with me, and perhaps impart other modifications useful in practice.

No. 1 Mixture.

Starch paste, made by boiling 5 grammes of starch in 100 cub. cents. of water	20 grammes.
Liquid ammonia	40 cub. cents.
(Digested for an hour.)	
White soap	5 grammes.
White sugar	5 "
Distilled water	500 cub. cents.
(Dissolved warm.)	

The above are mixed together and filtered.

No. 2 Mixture.

White soap	5 grammes.
Distilled water	250 cub. cents.
Liquid ammonia	40 "
(Dissolved warm.)	
Powdered gum arabic	5 grammes.
Distilled water	250 cub. cents.
(Dissolved warm.)	

Mixed together and filtered.

No. 3 Mixture.

Beef suet...	100 cub. cents.
Distilled water	400 "
Liquid ammonia	100 "
(Dissolved in water water.)	
White soap	0·25 grammes.
Alcohol at 36°	25 cub. cents.
(Dissolved in water bath.)	

Mix the above, and then add—

Aqueous solution of albumen, made by dissolving the white of one egg in 100 cub. cents. of water	20 cub. cents.
White sugar	25 grammes.

The two first mixtures give a material the drops of which dry slightly opaline. The third, on the contrary, is perfectly transparent, and is in consequence to be preferred.

The mixtures should be filtered into a horizontal dish, and the surface skimmed. The glass plates, having been cleaned in the ordinary manner, are one by one lowered into the dish, which contains only just enough liquid to cover the bottom of the glass without touching the top. They are raised and lowered two or three times running, and then taken out and placed upon a stand to drain. So that they may dry quickly, there should be a space of eight centimetres between each plate at least. It need hardly be said that they must be placed where the dust cannot get to them.

In this way a large number of plates may be prepared. As soon as dry, they are put away in plate boxes. When required for use, as many as are wanted for the day are put into an oval tub full of a 2 per cent. aqueous solution of alum. This solution, previous to use, is filtered through a conical filter and a tuft of wool. Only three minutes is required to filter 30 litres of the solution.

Into this solution the prepared plates are placed vertically, one beside the other, so that the prepared surfaces are sheltered. In a quarter of an hour the films have become insoluble.

The printed tissue is made to adhere to the prepared surface in the ordinary way. But before proceeding to this operation the film upon the glass is first of all washed under a tap to get rid of any free alum that may be about it; distilled water is recommended for this purpose.

The development of the carbon tissue is proceeded with in the ordinary way. The adherence of the tissue to the prepared surface is persisted in, even when boiling water is employed in place of only warm water.

After drying and application of the transfer paper, the separation of the latter and the image is easily effected. With a penknife the paper is cut round the margin of the plate, and the picture then leaves without difficulty. Indeed, the print will leave the glass frequently without the assistance of the penknife.

The finished print, under these circumstances, is harmonious and delicate in the highest degree. It has all the brilliancy and glaze of pictures which are termed enamelled. They may be immersed a long time in water without losing their brilliancy, although they are thus robbed of some of their superficial gloss. To preserve this latter, it is necessary, before detaching the picture from its gloss support, to paste on the back with starch an unsized piece of cardboard, and the print is thus preserved with all its original glaze. Sized cardboard takes a long time to dry, but not so the unsized material.

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* Read before the French Photographic Society.

The Photographic News.

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EDUCATION FOR PHOTOGRAPHERS.

The fact that some special agency for the education of photographers is desirable or necessary seems to be generally admitted when the proposition is stated; but it appears to be one of those cases which illustrate the theologian's explanation of the difference between assent and belief or faith. A man may assent to a proposition, and be quite unmoved by it; but if he believes it, or have a vital faith in it, he cannot be unmoved by it. On that in which he believes he will act; and as no action follows on the oft-repeated and generally accepted assertion that there is great need for specific educational or teaching agencies amongst photographers, it might be fairly assumed that there is little actual belief in the necessity. On the other hand, it may be affirmed that although the belief exist definitely enough, what is everybody's business is nobody's business, and that what is really required is a source or centre of power by which authoritative action might be taken to give effect to the generally existent belief.

Two things are, indeed, wanted in such a case: first, a definitely-formulated necessity, and its specific remedy; and, second, a body able and willing to apply this remedy. Mr. G. Cecil Hance, in another column, very clearly states the necessity, and he has on a former occasion formulated a remedy to meet the deficiency he has pointed out. Photography, as he points out, is the only scientific and artistic pursuit without a school. Chemistry, botany, zoology, geology, painting, each has its recognized school or academy. Technical education has of late years been much discussed in this country, and its necessity to progress in art industries fully recognized. There is no branch of art industry, or of fine art, or of applied science, in which such education is of more importance than in photography; but hitherto no recognised source of such education has existed. Photographers have "picked up" their knowledge of their art. Photographic societies have been formed, and these, of course, have had a valuable educational character; but they have not established schools, classes, or lectures, such agencies not being within their province. A score of years ago a photographic class was established in connection with King's College, but it soon dwindled into something like a private class, losing such authoritative character as it was at first supposed to possess. Notwithstanding all this, photography has progressed amazingly, and, if we were writing a political article in favour of the voluntary system, we could cite no example more to the purpose than the history of photography, which, without recognition or patronage of any kind from any authoritative source of honour or power, has grown so rapidly and so vigorously.

But because the uncultivated plant has flourished and grown so vigorously, it is not an argument against its cultivation. Rather the contrary, a proof that it is worthy of culture. It is already a great boon to mankind, and it is worthy of some effort to preserve and extend its growth and development. How can this be done? Mr. Hance, in a former article, which will be found in our volume for 1876, and in a condensed form in our Year-Book for 1877, enters into detail. He proposes the establishment of a board of twelve gentlemen, consisting of three qualified chemists, three painters (who shall be Royal Academicians), three qualified men of science, and three military photographers, officers of the Royal Engineers by preference. A school on the principle of the National School of Art, in which a fee is paid by students, is to be established. Masters have to be appointed, who will deliver class lectures, and give practical instruction. And after a due course and satisfactory examinations the council have power of granting diplomas or certificates of qualification. Further degrees would be available to those who took further honours. This is a brief *resume* of the plan proposed; but we earnestly advise all our readers to refer again to Mr. Hance's earlier communication.

Is such a scheme possible? Who is to initiate it? Many will say the scheme is desirable, but who is to bell the cat? It is there unquestionably that the difficulty lies. Possibly some existent organization would possess the best facilities for forming the nucleus of such a school. Here is a fine chance for the Photographic Society of Great Britain to break new ground, and secure to itself the gratitude and honour of photographers throughout Great Britain. It has been taunted with being simply a local society, situated in the metropolis, without anything of a metropolitan, much less a national, character; but a step in this direction would at once vindicate its title. It includes amongst its members certainly the best and most distinguished photographers in Great Britian; it includes the most capable teachers, both in the science, art, and practice of photography. It is probable, certainly not impossible, that, at least to begin with, honorary head teachers might be secured amongst its members. If the effort were made it need not be costly; it might, indeed, soon be made self-supporting, if not a source of income to aid other modes of progress. We commend this idea to those active, capable, and disinterested members of the council who have the interest of photography and of the Society at heart. We believe such a step would materially consolidate and cement the Society, and restore at once the prestige and *esprit de corps* never fully restored since the lamented disruption of a few years ago.

UTILIZING OLD COLLODION.

It not unfrequently happens, both in the establishment of the amateur and in that of the professional photographer, that an accumulation of collodion is found too old and insensitive to be worked with comfort. The portraitist will often hail this *treasure trove*, unless it be too extensive, with much satisfaction, knowing well that many fresh stocks of new collodion will be purchased too new to permit of good results; thin images with a tendency to fog persistently following the use of this new collodion. In such cases the addition of one-fourth or one-third of the over mature sample will prove invaluable in banishing the tendency to fog, and giving solidity and brilliancy to the image. But it will happen occasionally that the stock of old collodion is too large to be used in this simple and beneficial manner. We have occasionally found half-a-dozen quart bottles of such old stock, the residue of some series of experiments in collodion manufacture. Such old collodion is very efficient in plate cleaning operations; but we do not recommend any of our readers to try it if they would avoid severe and painful irritation of the eyes. There are still other methods of using the collodion.

A correspondent whose communication we give on another page details an interesting application of old collodion which he has found very successful. Adopting a suggestion made by Mr. Carey Lea in a paper read before the Philadelphia Photographic Society, he converted his old collodion into an emulsion, of remarkable excellence and rapidity, as the prints sent bear witness, consisting as they do of landscapes with figures, in one the figures consisting of cricketers apparently actively engaged in their game. In the process given by Mr. Lea, iodide of silver plays a part, hence the use of iodized collodion presents no difficulties. In using old iodized collodion for preparing a bromide emulsion, it would be necessary to wash the collodion first, and so remove the iodide salts, which are generally freely soluble in water, and therefore easily removed by washing in the manner usually employed in washing the collodio-bromide of silver emulsion. Something more than the mere economy of saving old collodion would be accomplished. One of the troubles in preparing emulsions consists in the difficulty in obtaining at all times suitable pyroxyline, most samples in the market being better suited for wet collodion work than for emulsion. The change or decomposition effected by keeping iodized collodion is well known. It becomes less tough, repellant, and horny, acquiring the pulverulent character, and adhering firmly to the glass, a condition often valuable in emulsion collodions.

The emulsion process described is also very simple and easily tried, and, as we have already said, judging from the results, it is one of the most rapid and excellent.

THE OLD AND NEW HYPOSULPHITE OF SODA.

A German chemist, Rudolf von Wagner, points out that since the discovery by Schützenberger of a new acid (H_2SO_2), the name of hyposulphurous acid for the compound $H^2S_2O_3$ is no longer possible; and, therefore, the sodium salt, which we have hitherto known by the lengthy name of hyposulphite of soda—or, familiarly, as hypo—must no longer be called by that name.

The modern hyposulphite of soda—or, as we may term it, the real hyposulphite—has very different properties to our old friend. The latter, as every photographer knows, divides with cyanide of potassium the post of fixer-in-ordinary in all studios, while the new and legitimate owner to the title is incapable of performing the service. The true hyposulphite has the property of precipitating silver from solutions of silver salt; and its vigorous reducing action is such that it will not be long absent from the photographer's laboratory.

Hence it behoves us not to confound the two salts. Wagner suggests that we should confer upon the old salt the name of thiosulphate, while that of hyposulphite is handed over to the new compound, whose entrance into the photographic studio will not long be delayed. We have been so many years connected with our friend hypo, that the re-christening will be a matter of difficulty; and some time must necessarily elapse before it is distinctly understood what salt is referred to by the name of hyposulphite of soda. However, as we are likely to find employment for both salts, it is no use hesitating. Chemists, who are not so wedded to the term hyposulphite as we are, will not be slow in calling the right thing by the right name; and photographers, therefore, must follow sooner or later. They will have to mark the difference between the hyposulphite and thiosulphate of soda.

ON CERAMIC ENAMELS.

BY NELSON K. CHERRILL.

No. I.

The process I am about to describe is capable of producing such very beautiful results, that I feel no apology is needed to your readers for the somewhat lengthy details into which I shall feel compelled to go, in order to give such instruction as shall be of any practical use to those who may be inclined to go in for the process. I think, however, there is one amongst your readers who will think that some apology is due to him for this publication—I refer to Mr. Watson, of Hull, from whom first I learned the process in all its details. His process, however, has been already published, word for word, as he gave it to me, in the *Philadelphia Photographer*, so that, as far as letting the secrets of another man's prison-house be known is concerned, the present paper will do neither harm nor good, except that, as Mr. Watson will see, I have gone back—after many thousands of experiments in search for improvement—to as nearly as possible the original formulæ as he gave them in 1869. I have, however, made many small additions and improvements in the mode of working, whereby I believe I have brought the process to the utmost limit of simplicity, and to the nearest approach to continuous success. Those who have tried the process know, most of them to their cost, that *uncertainty* is the great difficulty. I have worked hard at eliminating the causes of this uncertainty from the process, and I believe I have to a great extent succeeded. It is very difficult to convey exact instructions for a process the success of which depends almost entirely on personal skill in the operator; but as I know some of your readers would like information, I will do my best. Here, then, is my process exactly as I use it.

A piece of glass is cleaned with nitric acid, well washed, dried, polished, and coated three times with collodion. Now here, in the very first paragraph of my instructions, I know that many of my readers will fall out with me. They will say, "That is nonsense; any clean plate will surely do, no matter whether it be cleaned with nitric acid or by any other method." It is not quite so, however. A plate cleaned with nitric acid has less hold on the film than one cleaned by any other mode I know of, and, consequently, it is, in my experience, much more easy to get the film off a plate so cleaned. Then, as to coating the plate three times, perhaps this is not very well expressed; I mean, I coat the plate, and *place the collodion over it* three times—with the utmost deliberation—so as to obtain a very thick creamy film. My objecting friend will no doubt here inform me that it would be much better to use thick collodion at once. I have tried this plan, but do not like it nearly so well. The film, when prepared with a thick sample of collodion, is, in my hands, much more apt to become repellent of water (and thereby quite useless for the process) than one made of thin—that is, usual—collodion, flowed over the plate *very* slowly three times, so as to secure a good strong film.

This stage reached, plunge the plate in the bath, without letting the collodion get too much set; if the setting be prolonged, the result is not so good. A "nitrate bath" with me means a solution of thirty grains of pure nitrate of silver in one ounce of pure water, sunned all the while it is not in actual use, and, when used, rendered acid, in the proportion of two drops of pure nitric acid to a half gallon of solution. The plate remains in this solution till the greasy marks disappear; it is then taken out at once, and placed in a funnel to drain; it is allowed to drain not less than five minutes, and is then ready for the slide.

I arrange the copying camera in the studio so that the light which passes through the negative to be copied comes only through one of the side lights, and I have no reflectors of any kind. Behind the negative, however, I place a piece of finely-ground glass, which renders the light perfectly even. For this beautiful adaptation I am indebted to Mr. Baden Pritchard, who showed me the plan at Woolwich. The lens I use is Dallmeyer's No. 2B. With this, with the arrangement I describe, the exposure is from five to twenty seconds. If the enamel to be taken is of small size, I prefer to have a mask on the negative, and to block out all light except that actually needed, as this enables me to take four or five images side by side, by simply pushing the camera dark slide a little way each time. The slide I use is one that goes in sideways, and takes two C.D.V. pictures on one plate, side by side.

The exposure and development of the image is a matter requiring the greatest care and attention, as on the complete success of the transparency the whole process turns. The developing solution is made as follows:—

Pyrogallic acid	12 grains
Glacial acetic	4 drachms
Alcohol	4 „

Water to fill a 12 ounce bottle.

In warm weather this may be more dilute—say, as far as giving 20 ounces of water to the same quantity of pyro. Then, of course, more alcohol will be needed.

This should be made three days before it is used, as it is too vigorous in its action at the first. On the other hand, it must not be kept too long, as then it deteriorates in the other direction. These are the characteristics in development which, according to my experience, *must* be obtained in order to secure a good result. The image must develop very slowly. The image must attain the exact density required at the same moment that it attains the right amount of detail in the high lights. The image, when examined by reflected light, must not be "filled up" (if I may use such a term) in the dark parts, or at least the "filling up" must only extend to a very few tones, and above the very darkest. The image, when examined by reflected light, should show, in fact, nearly all the drawing and shading of the subject; while, of course, when seen by transmitted light, it should show up with extreme perfection. Every detail must be there, with a fair amount of density; but heavy blacks are to be avoided.

To secure these conditions in perfection is to secure a first-class enamel, as all the rest is a matter of course. In actual practice I find it best to place the plate on a level stand during the last stage of development, right under the tap; a full stream can thus be turned on at the exact instant at which it is required to stop the action of the developer.

The plate must be well washed at this stage, and the fixing must be done with cyanide of potassium. I prefer a weak solution, and carefully avoid pouring it upon the face or other delicate parts of the picture. The washing should be copious, and it should follow as quickly as possible on the completion of the fixation.

When the washing is complete, break off a small piece of the film at one corner of the plate, and direct a thin stream of water from the tap on this corner, making it strike on the bare glass. The use of a camel-hair brush here will facilitate raising the edge of the collodion, so that a large jet of water can be got under the film; this being directed in the proper manner, by tilting the plate, will effectually loosen the film from the glass. As soon as this is done, restore the plate to the horizontal position, and, with a pointed stick, like a penholder, break away from around the picture as much film as can well be spared. Clear off the broken pieces with the finger, and give a slight extra rinse under the tap. This must be gently done, as our film is all loose now, and may slip off if we are not very careful. Get about two or three ounces of water on the plate, holding it quite level, then, bringing the whole over a large dish filled a couple of inches deep with water, lower one end gently into the water, when the film will slip off into the dish without the slightest injury. If protected from dust the film may be left at this stage quite twenty-four hours without any injury or deterioration.

The next stage is the toning. To make up the toning bath just right is an important feature in the process. My procedure is as follows:—Get a sixteen-ounce bottle, half fill it with water, put it into a saucepan, also half full of water, and set the whole arrangement on the fire, or over the gas, till the water in the saucepan comes to the boil. If the glass bottle does not crack under this trial, it may be used with safety. Place in the bottle a quarter of an ounce of potassio-chloride of iridium, fill it up with cold water, and set it in the saucepan again; this time, however, do not boil the water in the saucepan, but place it where it will keep very hot; shake the bottle occasionally. After about half-an-hour, remove the bottle from the hot water, and place it aside to settle and cool; when quite cold it will be fit for use. This solution will remain good any length of time. I have a suspicion that it improves by keeping, but I am not sure on this point.

To make up the toning bath, proceed as follows: Place 12 ounces of pure water in a bottle; add to this 14 drachms of the iridium solution; shake it up well. Now add a few drops at a time, and shaking well between each addition, 7 drachms of a solution of chloride of gold (strength, 1 grain to 1 drachm). The bath is then ready for immediate use, but is better after keeping. It keeps indefinitely.

It is particular to note in this place that the solution in the iridium bottle will have a nearly black sediment; this is simply undissolved chloride. When all the clear solution has been used up, more water may be added, and this remainder used in the same manner as the first lot; but care must be taken that too much water is not added, as a quarter of an ounce of the chloride will not make two sixteen-ounce bottles full of the saturated solution, but only about one and one-third, or one and a-half.*

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ARTISTIC PERCEPTION.

BY W. HEIGHWAY.

Let us admit, for peace and quietness sake, that art is considerably crippled by photography. It is just one of those vexed questions best answered by—silence.

There is heaps of work for us to do, and, if it is not accepted as being done for the sake of art, let us devote it to the cause of the advancement of photography. After all, if we fight all our lives about it, we are only battling over a word, and neglecting a good cause for a term.

Ingenious objectors affirm that, except in a most limited degree, and in its very lowest phases, art has nothing in common with photography, because the latter must of necessity deal with nature only in its most literal aspect, whilst art idealizes and glorifies that which it portrays by poetic treatment.

If it offends anyone to hear you speak of poetic treatment in a photographic portrait, you will be, I know, very sorry, but it cannot be helped. I believe in it, because I have seen it. I have, too, seen miles of modern "art" without an atom of poetry anywhere about. Perhaps this does not prove anything. Well, I do not know that I am particularly anxious to enforce any lesson, because, when all is said, photography *is* photography; and if I can only induce you to appropriate of art any of its principles, its laws, its dodges, to assist in the improving of your work, I shall be satisfied.

After all, there is no reason why photographers should not be artists. Art is not a mystery, though it is in the sense that it is inscrutable how much so-called "art" is accepted as such, and frothily-praised in stereotyped twaddle by gushing noodles. True art is no mystery—it appeals to the heart of every one of us. One would think, to hear people talk, that the artistic brotherhood was a sort of priestcraft, or secret society, and that none but those on whose heads was poured the sacred oil could minister, and none but the favoured few appreciate.

Say a new "school" has arisen—and it is marvellous how much fashion has now to do with art—a new school, cruder in colour, more outrageous in conception, and more oblivious to the true rules of perspective, than, if possible, any of those whose productions we have to bow down to now. I am taken to see the great masterpiece of the regenerating school, and told to admire. Unfortunately, I cannot, and, more unfortunately still, I cannot conceal my want of enthusiasm. Great heavens! What a howl is raised at my want of taste! For beauty, I would prefer a good photograph of a moderately pretty, healthy

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* At the risk of transgressing certain laws (held sacred in the editorial chair), I may mention that I use the gold and potassio-chloride of iridium purchased from Messrs. Johnson, Matthay, and Co., and that the tablets used are those made by Messrs. J. J. Atkinson, Manchester Street, Liverpool.

Englishwoman, to that red-haired, bony individual of uncertain nationality, popularly styled classical, because what little dress she indulges in is semi-transparent, and has a Greek border.

Too readily people follow a blatant, self-assertive idiot, who, in assuming the language of the oracle, imposes on the credulous the idea that he is inspired, and gains far more attention than one who endeavours to show that the pathway to art is barred to no one, though few may reach the portals of the temple, and fewer yet enter it.

The fact is that directly a study is simplified it is despised, and an art-teacher, to be thoroughly believed in, must indulge in mystifying technicality and high-sounding phrases meaning nothing, and he is at once hailed as a great apostle of art.

It is of importance that you should thoroughly recognise the fact that superior results are to be secured by higher intelligence and perception and greater knowledge, not alone of the manipulations in photography, but in an acquaintance with the rules of art and recognition of the beautiful, or I fear I can never hope to be of service to you.

Let one model be treated by different men, and vastly different results will be attained, and many degrees of excellence or failure will be shown. One at the top of the scale may be so superior that you can see he has brought out in his picture the reflection of the very soul of the sitter, while the others are dull, prosaic, and insipid. By a knowledge of the best points of likeness, the one has secured a portrait—by artistic arrangement he has subdued all unfavourable features—in the skilful arrangement of light and shade he has brought out the best points of his sitter and soft gradations of colour and brilliancy of effect—and by sympathy he has charmed the expression to give life to his picture; and for the result, with the same model, the same camera and lens, and no difference in the chemicals, he has succeeded in producing a charming and life-like picture, where others have failed utterly.

Feeling in art does not require, though it delights in, youth and "beauty." From almost every sitter the artist may secure results immeasurably superior to the usual dead-level of soul-less photography now offered to the public at so much a dozen as pictures.

The miserable caricatures which are usually called photographic portraits have, no doubt, caused the belief, though it is an erroneous one, that photographers have no control over their subjects; but we have seen that there is scope for artistic treatment, because, above the ordinary miserable run of unsuccess, the picturesque and beautiful treatment to which sitters in photographic galleries of the more artistic order are susceptible has been shown.

The artist, if he is great, will ennoble every subject he treats. To him nothing is in vain—nothing beneath his notice—no detail too insignificant, though he can grasp the grandest subject and appreciate it.

It is from little things that great masses are made, as the statue has been cut out by little chippings, and the marble itself is composed of tiniest atoms. From the keen appreciation of form, character, and colour of things you will become conscious that in your gallery the work is not up to the mark.

That's what I want! Think so; and keep on being discontented—actively discontented—and your work will improve rapidly.

There are ways of doing things correctly, but if you are ever so wrong, and do not know it, you couldn't slip into the right track even by accident, much less try for it; but the man who knows he's wrong cannot, though he has to trust to chance for it, fail to strike the correct course, if he doesn't faint by the way—and that's hardly likely if he has plenty of pluck.

Don't be discouraged because you make a caricature now and then. Take it as a joke, not a very good one, perhaps, but enough to make you smile and to determine never to do it again. It is wholesome sometimes, I think to see what a mess you can make of things; it is just a wholesome sort of reminder against being stuck-up and conceited.

Don't be too critical with yourself—you will feel a kind of rebellion against too much severity—unless you are quite an angel, which I suppose you're not yet? Work on and keep going, and don't stop to judge until your last plate is developed, and it ought to be the best, or pretty nearly. Even if it turn out the worst, don't let that discourage you. Determine that to-morrow's sun shall light up some elegant poses, and see some right down splendid negatives.

In a race, the boat that is going to win is not stopped every now and then to set straight a trifling raggedness of stroke, but the oarsmen just peg away.

Besides, others will criticise us fast enough—never fear for that!

THE EDUCATION OF PHOTOGRAPHERS.

BY GEORGE CECIL HANCE.

Some time since I endeavoured, through the medium of the Photographic News, to induce the members of the profession to combine for the purpose of establishing a school for the education of the aspirants of photography; but it appears that up to the present time nothing has been attempted towards the formation of such an institution. An editorial article on a subject closely allied to this appears in the News of the 25th January, in reference to lectures on photographic chemistry being given in London and elsewhere; so that I am again tempted to appeal to photographers generally to assist in forming a school for young photographers.

It must be borne in mind that photography is the only scientific and artistic pursuit that is without a school, chemistry, botany, zoology, geology, &c., each having one; and when one reflects how many persons there are engaged in photography, how many photographers there are who have made considerable sums of money by its aid, it certainly does appear somewhat strange that nothing has ever been tried to found a school in connection with the art. Photographers, and especially those who employ many assistants, should remember that the profession is in a very different state to what it was about fifteen to twenty years ago. All, or nearly so, of those gentlemen who have attained to prominence and position in photography are the pioneers, by whose industry and skill the art has been brought to the perfection it now has. These gentlemen found and made discoveries, working them out, utilising the good, and casting on one side the bad. But, alas! they are only mortals, and they must eventually pay the debt of nature; then one naturally asks who is to take their places; and it is my opinion and firm conviction, that unless there is a school for the education of photographic operators, &c., where time and every facility would be given for teaching and learning everything requisite to know in the art, the future of photography has not a very brilliant prospect. Now that we have the pioneers amongst us, let us endeavour by their tuition and knowledge to educate the new comers in the ranks. There are some of these gentlemen especially qualified to instruct and teach, and if the matter were vigorously taken in hand, doubtless they would willingly assist in giving a genuine school of photography a helping hand.

I sincerely trust that ere long some means will be taken to start a school, the establishment of which will prove of great lasting benefit to all who are in any way connected with photography.

EMULSION FROM OLD COLLODION.

BY RICHARD MURRAY.

Having a lot of old collodion left over from last year, and being fond of trying experiments, I will tell you what I did with it. Reading the News while I smoke my pipe, I often come on a good thing (I mean reading the old volumes). I one day saw an emulsion process by Mr. Carey Lea. "The very thing!" I said to myself; "I will mix old and new collodion together in equal quantities, and make a few plates for my summer holidays." I added two grains of bromide of cadmium to each ounce of collodion, following the directions laid down, with the exception of the preservative, for which I used the following:

Beer	1 ounce
Pyro	1 grain

Any of your readers will find details in the News, page 315, July 2, 1875; but, for the benefit of those who have not the volumes, I will repeat the process. A quantity of collodion is poured into a dish, and let set; then a silver bath is poured on it, and, after a sufficient time (say, one hour), it is broken up into lumps and the preservative poured on; then thoroughly washed and dried. You can keep the flakes any length of time. When you want to use, you have only to emulsify them with equal quantities of ether and alcohol, and when thoroughly dissolved you have only to spread it on the plates and dry. They are as sensitive as coffee or any bath dry plates.

I develop by putting them into warm water in a dish with a few drops of ammonia (say a quart of water to four or five drops); you will see the picture flash out immediately if the exposure is right. I then take it out and wash under the tap, until it will take kindly to the intensifier, which is:—

Pyro.	5 grains
Citric acid	10 ,,

Pour this on and off a few times, then add a drop or two of silver; repeat the pouring until you get the intensity you want. Fix with cyanide. There is no blistering with these plates. You can hardly rub them off, the film is so hard. The collodion I use is Mawson's, with some of my own make.

You will see by the enclosed cards what the process will do. I have taken a good view in thirty seconds with a one-eight stop quarter-plate lens. I have tried nearly all the dry processes known, and could always make something of them; but I never got better negatives than by the use of old collodion made into a new process.

PHOTOGRAPHY IN GERMANY.

My Visit to the Berliner Phototypisches Institut.

BY ERNEST DUBY.

It is not an easy thing to be introduced into a good establishment for Lichtdruck, and, therefore, I was very thankful to Messrs. Jacobi and Prager when, on my calling on them to get our Society's diplomas printed in photocollography, they kindly invited me to visit the whole of their establishment.

The productions of Messrs. Jacobi and Prager are advantageously known, both in Germany and other countries. The technical director of this establishment, Mr. C. H. Jacobi, is one of the oldest photographers in existence. He had, during a long series of years, a Lichtdruck establishment at Neuendorf, near Collence, and I presume that his works have gone all over the world. In the year 1875 he came to Berlin, where he formed a partnership with Mr. Rob. Prager, and they established, under the name "Berliner Phototypisches Institut," an institution for photocollography and for photo-lithography.

The Berliner Phototypisches Institut is situated in the centre of the town at the Seydelstr. 29, the studio for taking the negatives being at the Alte Jacobstrasse. The printing rooms are all very spacious, and provided with whatever may be necessary. The first room you enter is used for washing the exposed plates. The troughs therein are exceedingly large, so that plates of an enormous size may be washed. Next to this room there is the printing room, where the plates are exposed to the light. I saw there printing-frames larger than a square metre—indeed, the Berliner Phototypisches Institut is able to produce prints to a surface of one square metre. In the same room negative retouching is done.

Messrs. Jacobi and Prager showed me the collection of negatives they had systematically gathered into a book. As is necessary with the Lichtdruck, the pellicles had all been taken off from the glass, and I was much astonished to see these negatives (pellicles), though of a considerable size, without the least rent. On my question, how they would take off the negatives from the glass, they kindly described me their method. Here it is:—Before collodionising, the plate must be coated with a weak solution of caoutchouc. After fixing and washing, the negative must be somewhat warmed by hot water, and then a solution of gelatine of about ten per cent. is poured on it, carefully avoiding the formation of air-bubbles. When that gelatine film is dry (the negative must be dried in a horizontal position) the negative will be retouched as usual, and then the borders being cut with a knife, the pellicle will be easily drawn off. This method is very simple, and always gives good results. I saw there pellicles of 75 c.m. long and wide.

Next to the printing room, there is the dark room, a very large chamber. Along the wall the chests for drying the plates were standing. The heat is produced by a combined system of gas-flames; and, according to M. Jacobi's statement, the temperature required for drying does not exceed 45° C. The system of heating is very perfect, large plates of one square meter being dried equally over the whole surface. A channel conducts the products of combustion into the open air.

The most interesting part of the establishment is the room with the schuell-presse. This press has been constructed according to the instructions of Mr. Jacobi, who, not being willing to pay the 5,000 marks requested for the communication of the construction of a quick-acting press, has himself succeeded in constructing one that does the most beautiful work. The fatty ink first goes over a system of distributing rollers, from thence to the inking-board that brings it to the inking rollers. By a very nice mechanism, the foremost rollers (the lime-rollers) only touch the plate when it advances, and are lifted when it retires.

The construction of the protecting-frame that prevents the border of the print from being soiled by the printing-plate is also an invention of Mr. Jacobi's, and does the greatest honour to his genius. The machine works beautifully, and rather quickly. In a few hours an issue of about one thousand number of a picture twelve by sixteen inches was printed during my staying there. Indeed, with this machine, Messrs. Prager and Jacobi will furnish the most considerable edition in a very short time.

On the left hand of this room there is that with the hand-worked presses. The Berliner Phototypisches Institut is actually working with fifteen to twenty hand-presses, and does a great deal of work on them. On one of them a man printed micro-photographs on gelatino-sheets for the purpose of being used for lanterns, and I was really astonished to see with what extraordinary acuteness and detail they can be printed.

In another room several young girls were busy with retouching, and in some others I saw the paper stock of the firm, as well as the private laboratory of Mr. Jacobi.

Finally, Mr. Prager showed me their collection of samples, and I must confess that never in my life have I seen a more beautiful collection of Lichtdrucks than this. Among these there were views of the Royal Castle of Berlin, landscapes, reproductions of drawings and oil paintings, portraits, &c.

What produced no little astonishment in me was that those gentlemen showed me several beautiful photo-collographs *in natural colours*, looking exactly like those of Mr. Jos. Albert, of Munich. Several of them were reproductions of oil paintings, and I was surprised to see how faithfully the colours of the original had been reproduced. They are not *painted* photographs, but, on the contrary, done nearly in the same manner as those of Mr. Albert; and Mr. Jacobi told me, smiling, that he had produced such pictures a couple of years ago, but not being fond of telling everything, the number of those who knew of his Lichtdruck in natural colours was very small.

I hope that in a short time I shall be in a position to send you some examples of Mr. Jacobi's pictures.

METEOROLOGICAL STATISTICS, 1877.

BY WILLIAM H. WATSON, F.C.S., F.M.S.

I have constructed the following table from my observations taken at Braystones, near Whitehaven, during the year ending December 31st, 1877 :—

1877.	TEMPERATURE.*																Barometric Pressure.†				Weather.‡				Rain & Evaporation (As Registered by J. D. Watson).	
	Highest.			Lowest.			Mean.				Mean of the previous Three Years.			1877 as compared with the mean of the previous 3 Years.												
	Mornings.	Noons.	Nights.	Mornings.	Noons.	Nights.	Mornings.	Noons.	Nights.	Mean of all Observations.	Mornings.	Noons.	Nights.	Mornings.	Noons.	Nights.	Highest.	Lowest.	Date on which it was Highest.	Date on which it was Lowest.	Fair Days.	Days on which rain fell.	Fair Days Bright.	Fair Days Gloomy.	Rain.	Evaporation
January ...	50	53	48	32	35	32	41·0	44·1	41·0	42·0	40·4	43·1	40·3	0·6+	1·0+	0·7+	30·20	28·50	21st & 22nd	1st	2	29	0	2	9·38 inches.	3·24 inches.
February	50	58	48	28	29	25	42·6	44·2	42·4	43·0	37·5	41·8	38·6	5·1+	2·4+	3·8+	30·18	29·00	28th	19th	9	19	8	1	3·00 ,,	1·88 ,,
March ...	47	53	46	30	36·5	32	39·6	44·6	39·5	41·2	40·4	45·4	40·6	0·8—	0·8—	1·1—	30·10	28·82	1st	25th	9	22	8	1	2·64 ,,	2·29 ,,
April ...	53	58	48	29	41	38	43·8	49·3	46·7	46·6	46·9	53·0	46·0	3·1—	3·7—	0·7+	30·00	28·90	19th	4th	18	12	9	9	2·42 ,,	4·78 ,,
May ...	55	65	56	38	43	37	47·3	51·7	46·1	48·4	48·8	54·0	49·3	1·6—	3·7—	3·2—	30·20	28·79	1st & 22nd	28th	19	12	11	8	4·64 ,,	4·33 ,,
June ...	74	77	70	54	56·5	50	60·6	65·2	58·3	61·4	57·8	63·7	55·3	2·8+	1·5+	3·0+	30·08	29·18	15th & 30th	1st	17	13	14	3	2·60 ,,	4·89 ,,
July ...	65·5	68	63	52	56	51	59·4	62·6	57·5	59·8	61·7	66·3	59·8	2·3—	3·7—	2·3—	30·08	28·76	30th	15th	12	19	7	5	4·25 ,,	3·52 ,,
August ...	68·5	77	64	53	56	47	61·0	65·3	58·4	61·5	60·3	64·2	59·1	0·7—	1·1+	0·7	29·99	29·19	12th	8th	13	18	7	6	5·95 ,,	3·49 ,,
September...	58	62	59	43	47	43·5	49·7	57·1	50·9	52·5	55·5	60·7	54·0	5·8—	3·6—	3·1—	30·32	29·31	17th	11th	18	12	11	7	2·34 ,,	2·77 ,,
October ...	52	58	55	39	46	36	49·1	52·8	43·0	48·3	49·7	53·6	49·4	0·6—	0·8—	6·4—	30·14	28·79	31st	11th	10	21	4	6	6·16 ,,	2·12 ,,
November...	50	56	55	36	41·5	34	45·3	48·0	45·8	46·2	41·7	44·8	41·6	3·6+	6·4+	4·2+	30·11	28·23	16th & 17th	11th	8	22	5	3	10·09 ,,	2·03 ,,
December....	49·5	51	49	28	33	33	41·2	44·6	42·4	42·7	41·0	44·0	41·8	0·2+	0·6+	0·6+	30·50	29·07	19th	16th	11	20	5	6	5·05 ,,	1·15 ,,
In the whole year ...	74	77	70	28	29	25	48·4	52·5	47·7	—	—	—	—	—	—	—	30·50	28·23	December 19	November 11	146	219	89	57	58·52 ,,	36·49 ,,

* It is seen by a comparison of the mean temperatures of the year 1877 with those of the previous three years, that in the winter months—namely, January, February, November, and December—the temperature of 1877 was considerably *above* the average; while in the spring and summer months, with the exception of June, the mean temperatures were much *below* the average of the previous three years—that is to say, in the year 1877 we have had a comparatively warm winter, but a cool spiing and summer. The mean temperature of March was, indeed, below that of January.

† Referring to the barometric pressure, there was a very great depression on the 11th November (28·23 inches), while on December 19th the pressure was very high, namely, 30·5 inches. Sudden changes in barometric pressure are shown to be unfavourable to health, and the year 1877 has been somewhat noticeable in respect to such fluctuations.

‡ We had a large number of rainy days during the year; compared with the number of fair days, the days on which rain fell preponderated by 73; and as compared with the number of days on which rain fell in the year 1876, those in 1877 preponderated by 33. Of the total number of fair days, however, the bright days exceeded the gloomy by 32; but the bright fair days in 1876 were 22 more than in the year 1877.

With regard to processes in which the chemical action of light is required, and therefore to healthy living action, the past year has been very unfavourable.

Further comparisons may be made by referring to the summaries for 1874, 1875, and 1876, Photographic News, vols. xix., xx., and xxi., pages 93, 161, and 197 respectively.

Correspondence.

THE PYRO-HYDROGEN LIGHT.

Dear Sir,—In justice to the manufacturers of the "Pyro-Hydrogen Light," I must ask you to kindly insert the following remarks in reference to the trial of lanterns at the last meeting of the Bristol and West of England Amateur Photographic Association, a report of which meeting was given in your issue of January 18th.

From the report as given it would appear that the Pyro-Hydrogen light was inferior to the light of the other two lamps (viz, the Sciopticon and Newton's Refulgent). This statement, though in one sense correct, is, *through the omission of certain important particulars*, anything but correct, and somewhat misleading.

In the first place, I may state that the Sciopticon and also Newton's Refulgent lamp were both used in lanterns having for the object lenses French quarter plate portrait combination, having a diameter of about 1⅔ inch, and were worked *with full aperture.* The Pyro-Hydrogen light was worked with lenses having a *fixed diaphragm of three-quarters of an inch*, which alone would account for a vast loss of light.

In the second place, the pyro light was used in a lantern to which the jet had not been fitted, and consequently the light could not be so moved into the correct focus of the condensers, and also not being fitted with the requisite adjustment for height could not be correctly centred, thus placing the light at a manifest disadvantage.

Through an oversight on the part of the optician, in omitting to send an adapting tube with the lenses, an additional combination had to be screwed in, in a position where it was not correctly placed.

Taking these facts into consideration, the only wonder is that the light compared as favourably as it did with the others.

Having had the adjustment and necessary alterations made, the light is wonderfully improved, and gives great satisfaction.

I should also add, that through some slight disarrangement of the glasses, the Refulgent lamp was not working at its best, and though the Sciopticon on that occasion gave the better light of the two, the light of the Refulgent is certainly more evenly diffused over the disc.

My desire to do justice to a clever and really useful invention is my reason for troubling you to insert this communication.—I am, dear sir, yours faithfully,

Edward Brightman.

STEREOSCOPIC TRANSPARENCIES.

Sir,—With reference to Mr. J. Harmer's communication in the Photographic News of the 25th inst., I can only say I was not aware of that gentleman's existence. I have heard Mr. Breese mention his name, saying at the same time that he was the only man besides himself who knew anything whatever about combination printing for the stereoscope; but he repeatedly gave me to understand that he did not tell Mr. Harmer more than he could help. As Mr. Breese had evidently had some misunderstanding with Mr. Harmer, I never pressed Mr. Breese on the subject of Mr. Harmer's connection with him.

I at one time thought seriously of advertising for Mr. Harmer, with a view of making terms with him (if possible) to assist me in publishing stereoscopic transparencies, taking Mr. Breese's negatives as a nucleus to start with; but the idea fell through. Mr. Breese either could not or would not give me any clue to finding Mr. Harmer, and I concluded, as he had not been heard of, that either he had left the country, or that he was no longer in existence; for, so enthusiastic have I been with regard to these slides, that I could not bring myself to believe it possible that a man possessing the information necessary to their production would have failed to make use of it in some way—commercially, if so inclined; and, failing that, he would, in the interests of science and art, make the information known for the benefit of others. But Mr. Harmer, no doubt, had his reasons for silence on the subject, and I am quite willing to credit him with the very best intentions.

Judging from a first perusal of Mr. Harmer's letter, he evidently has a very intimate and practical knowledge of the subject in hand. I do not purpose dealing with the letter now, as it is probable I may refer to it in my next paper. A good deal of the information I intended to give, Mr. Harmer has forestalled me in; but that I do not mind so long as the information gets into the right quarters and results in reviving the interest in stereoscopic work. I neither seek nor do I desire any *kudos* in bringing the subject before the photographic world. I was asked to give a paper, and the subject I chose was, naturally enough, the one I take most interest in, and the one I know most about, as far as photography is concerned.

There are two points I should like to notice in Mr. Harmer's letter before I conclude. He deliberately says that Mr. Oakes's description of Mr. Breese's method of colouring is not correct, I beg to say that it is correct as far as my description goes. I described from memory the slide painted for me by Mr. Breese. I saw him paint it, and the method he adopted in colouring it was as I have described. I am satisfied that Mr. Harmer's account of the way he coloured the original slide is also correct. It is just the way Mr. Breese would go to work, and is very characteristic of him.

The other point I wish to notice is that mentioned in Mr. Harmer's closing paragraph, in which he calls me to account for an expression I used—an expression, as he says, hackneyed in photographic literature. This fact speaks for itself, and proves that it must have had some foundation; but I withdraw it so far as I am concerned. I have no wish to be otherwise than kind and courteous, and I do not know that I had any special meaning in making use of it.

In conclusion: I can only say I am very glad Mr. Harmer has made us acquainted with his existence, and I trust I may look upon him as a powerful ally in reviving the interest in stereoscopic work.—I am, yours, &c.,

S. H. Ashley Oakes.

16, *Silverwell Street*, *Bolton*, *January* 26.

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Talk in the Studio.

South London Photographic Society.—The next meeting of this Society will take place on Thursday next, February 7th, in the Rooms of the Society of Arts, Adelphi, when a discussion will take place on Mr. Pearsall's paper—"Educational Aids by Photographic Exhibits."

Etching Fluid.—A German contemporary recommends etching with a preparation of 250 grammes of perchloride of iron, which is allowed to slowly decompose in half a litre of water. The advantage of this preparation is said to be that it has an effect on metals of all sorts without giving off noxious vapours. The object will need constant cleaning with a brush. The solution is rectified with oxide of iron when choked with metal; the etched ground is cleaned with turpentine.

Bluing Iron and Steel by Boiling.—If iron or steel articles be boiled in the following mixture they will take a fine blue tint:—Dissolve 4 ozs. hyposulphite of soda in 1½ pints of water, and then add a solution of 1 oz. acetate of lead in 1 oz. of water.

Cleaning Engravings.—Put the engraving on a smooth board, cover it thinly with common salt finely powdered; squeeze lemon juice upon the salt, so as to dissolve a considerable portion of it; elevate one end of the board, so that it may form an angle of about 45° or 50° with the horizon. Pour on the engraving boiling water from a tea-kettle until the salt and lemon juice be all washed off; the engraving will then be perfectly clean and free from stains. It must be dried on the board, or on some smooth surface, gradually. If dried by the fire or sun, it will be tinged with a yellow colour.

To Correspondents

S. P. Q. L.—The lime-lights used with a magic lantern, or enlarging camera on a similar principle, will give good images on wet collodion with very short exposure. We have tried formulæ alleged to give a rich tone to merely developed collodion images, but have not found them succeed. We have found that, using a matured commercial sample of bromo-iodized collodion, a new silver bath in good condition, and a pyro developer with a good proportion of acetic acid, warm tones could be secured by giving a full exposure and short development, and black tones by shorter exposure and longer development.

J. J. K.—The transfer paper (which you see mentioned) is that used for carbon prints; but it may with propriety be used for collodion prints. Some years ago, when collodion transfers first obtained attention, an enamelled paper was sold by the dealers to which the collodion film was transferred. It would not be difficult to transfer direct to cardboard. We should proceed as follows:—Immerse the plate—with the finished collodion film—in weak acid and water, remove when the film loosens, and wash well. Take a sheet of tracing paper a quarter of an inch less than the plate, and lay it on the film; turn the edge of the film over the tracing paper, like a blur. This will enable you to lift the film away easily and safely. Now lay the film down on a piece of prepared cardboard; place a few sheets of blotting-paper over the tracing paper and film, and, with a squeegee, press into firm contact with the cardboard, driving out air-bubbles and water. Now remove the tracing paper, and, if air-bubbles or points of imperfect contact are still seen, again treat with squeegee; cover with paper; place under a weight, and allow to dry. The preparation of this cardboard would consist in giving it a coating of dilute solution of gelatine, and allowing it to dry. We have seen this method of laying down a collodion film on canvas practised with success, and it should answer for cardboard as well. There is no work specially treating of the subject.

C. W.—There is no improvement upon the graphogenic apparatus. It answered well in the hand of the inventor, Mr. Edwards, who is a skilful manipulator, but how far it has been a success in the hands of others we cannot say. The only safe mode of finishing a negative in the field, so as to obviate the need of intensifying, &c., at home, would be to use a tent or manipulating box.

A New Hand.—Considerable latitude exists as to the proportion of glass. We should have six or eight feet opaque at each end of sides and roof, the rest glass, each end opaque, the side lights coming to within twenty inches of the ground. The glass on the south side would be generally partially obscured by thin white blinds, which could be removed in dull, dark weather. The background slide should be seven or eight feet high and six or seven feet wide; curtain pole about eight feet high. The walls may be paper, with any neat light paper, preferably of a grey tint.

John Spark.—The focus of a lens is the point at which it gives a sharp luminous image. Hold the lens so that it would form an image of the window of a room on the wall opposite. Hold it a few inches (say six) from the wall, moving it gradually away, until you see the image of the window grow sharp and bright. The distance from the wall to the lens is the length of focus.

A. B. F.—It is quite clear that some contamination comes into contact with your gold bath; but what, we have no means of suggesting. Try distilled water, and try, if necessary, another formula, of which you will find many in back volumes of our Year-Book.

C. W. B (Amateur).—Filter your bath, and add nitrate of silver to bring it to the proper strength. You will then probably find it work all right. If not, add a trace of nitric acid. The cyanide of silver may be converted into nitrate by the addition of nitric acid.

Junius.—We have no means of knowing what is used to colour the paper. There the manufacturer is the only person who can help you. The chief cause, in our experience, of paper printing red and toning slowly, is the presence of excess of albuminate of silver compared to the chloride. Patience, and slightly warming the toning bath, we have found the remedies. But we should consult the manufacturer of the paper.

Joshua.—We have seen the engraving. We should not think it likely to be valuable for reproduction by photography. The portraits of a by gone royal family do not excite much enthusiasm even amongst the most loyal people.

W. G. P.—There is no law in regard to the private practice of photography on Sundays. The practice of photography as a trade on Sundays would be illegal, as would the practice of any other trade. The sanctity of the Sabbath as a Divine institution is regarded by many intelligent persons as no longer in force, having ceased with the termination of the Judaic economy. But whether you have religious scruples or not, it is generally well to have some respect for the common sentiment of the society in which you live. Bear this in mind in regard to Sunday photography.

Enamel.—In the series of articles on enamelling which we commence this week such formulæ will appear.

R. Tudor Williams.—Many thanks in advance.

Several Correspondents in our next.

The Photographic News, February 8, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Better Exhibition of Photographic Work, and Mr. Bassano's Projected Summer Exhibition.

That there are sadly lacking in London opportunities for the display of photographic works no one will deny, and it is a point, indeed, to which we have already called attention many times. The pictorial photographs of such men as Robinson, Blanchard, Hubbard, Rejlander, Earl, Slingsby, and others too numerous to mention, are quite unknown to the general public, for the simple reason that their display is so limited. One or two shops in London exist where the more ambitious works of photographers are to be seen, but the display is altogether inadequate. What chance has Mr. Robinson of making a commercial success of his medal picture, "When the day's work is done," or Mr. Slingsby recouping himself for the labour and expense involved in that charming composition "Alone"? Several visitors to the late exhibition at Pall Mall expressed a willingness to purchase copies of the pictures exhibited, but, unfortunately, little facility was afforded for the sale of exhibits. The same may be said of the fine landscapes shown—those of Payne Jennings, for instance. If it were generally known that such sketches were on sale in the Strand, or in Piccadilly, or in the Haymarket, and the productions themselves were placed day after day before the eyes of the public, there cannot be a doubt that a large business would be done in photographic art productions. We photographers, of course, know very well where all these things are to be bought, but then photographers themselves are not purchasers of their own productions. What is wanted is to place the pictures better before the buying public, and let them know that such things are for sale. Pictorial photographs are not sold in any numbers simply because nobody knows of their existence. We know two gentlemen at this moment who have some of the finest examples of photographic work hanging upon their walls. They are large composition pictures, and broad views from the river Thames and the Lakes. One of these gentlemen is a physician, the other is a lawyer, and their mutual object in purchasing the pictures to adorn the rooms where clients and patients wait was not simply by reason of the beauty of the productions, but because fine photographs of large dimensions were so rare. A rustic villa, half hidden in foliage, on the banks of the Thames, with undulating woodland scenery in the background, and this, too, measuring some three feet in diameter, is a picture at once attractive and interesting, and works of such a type have only to be made known to be readily purchased. How is this to be done? Shopkeepers, of course, simply study their own interests—or, rather, what they imagine to be their own interests—and this means the exhibition of cartes and cabinets in their windows. It is rare, indeed, to see any work of importance exposed for sale; and as to the best pictures recently exhibited in Pall Mall, we do not remember one instance of their having been shown for sale. It is a question, however, whether private individuals are able to effect what the art-photographer wants; and, if the exhibitor happen himself to be a photographer, others in the same walk of life would scarcely benefit, we should think, by sending their photographs to him. Mr. Bassano, whose fine establishment in Old Bond Street is known to many of our readers, has just issued a circular—or, rather, enclosed one—signed by Mr. Granville Grant, as secretary, inviting photographers to contribute to an Annual Exhibition of photographs to be held at 25, Old Bond Street. Now, obviously, if the exhibition were managed by the contributors themselves, or by gentlemen chosen to represent them, who would have the interests of one and all in their hands, nothing but advantage could possibly accrue to those showing their work at such an exhibition; but this, so far as we can gather from the circular, is hardly the case. All photographers are invited to send contributions, but they have no voice, directly or indirectly, in the conduct or arrangement of the exhibition. We fear that few will respond to such an invitation, any more than manufacturers would if invited to show their wares in a retailer's shop. The proposition is, it seems, otherwise, fair enough. Mr. Bassano disclaims making any profit out of the show, and says that "the entrance fee at one shilling will meet the charges for advertisements, catalogues, and other minor incidental expenses. Should there still remain at the close of the exhibition a sum in hand over and above these imperative costs, such surplus will be presented to the funds of the Photographers' Benevolent Association." It is Mr. Bassano's object to place two or three large gallaries, situated in New Bond Street, "with splendid light and ample wall space, and which have already a wide reputation as exhibition rooms," at the service of photographers; and all the profits, after paying for advertisements, catalogues, and minor incidental expenses, are to be given away, and not a penny to go to Mr. Bassano himself—that is, unless under "minor incidental expenses" are included as items the rent for a suite of galleries in Bond Street during the season, and the salary and wages of secretary, money-taker, and attendant, and then they would amount, we should imagine, to more than would be spent on the score of advertisements and catalogues. It Mr. Bassano does not want any rent, and the secretary craves no salary, then indeed it would be a philanthropic act towards his brother photographers to exhibit their works in this way; but for all that, we scarcely think the arrangement would be satisfactory either to them or to him. Philanthropy is, after all, not business, and it is only upon a sound business basis that such an exhibition could be conducted. It may be that we have not entirely understood Mr. Bassano's object, which, he says, is "simply that an exhibition of photographs may be placed before the public at the most favourable season of the year; but at present our impression is, that inasmuch as the exhibitors would have no sort of control over the Exhibition, they may hesitate to contribute to the same. Mr. Bassano is quite right, however, in believing that there should be a general exhibition of photographs in London during the session, and we hope the time is not far distant when such will be the case. But there are several partial exhibitions even now, as, for instance, that of the Autotype Company, Vernon Heath, &c.; but to these photographers in general would hardly consider it their interest to contribute. Supposing Mr. Bassano would accept a moderate rent for his galleries, and they are spacious enough (as we think they are for such an exhibition), he would be doing good service indeed to allow an annual photographic exhibition to be organized upon his premises, the hanging committee or committee of arrangements being elected by the contributors, who would thus be all personally interested in the collection of pictures. Indeed, we have reason to think that the Photographic Society of Great Britain would be only too pleased to aid Mr. Bassano in his object, for it has been for some time past its aim to get an exhibition in the spring or summer, instead of the late autumn. The difficulty, so far as we have understood, has been the inability to secure a gallery, even at a high rental, such as Mr. Bassano now comes forward to offer almost gratuitously to his photographic brethren.

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PHOTOGRAPHY AS A MEANS OF DISCOVERY IN PHYSICAL ASTRONOMY.*

In observation of the sun's surface it is known that photography has hitherto failed to reproduce certain details that are furnished by powerful instruments. The most remarkable photographs of the sun that have been obtained—such as those of Warren de la Rue and Rutherford—give the spots and faculæ pretty well; but in the surface properly so called they do not show the details of those granulations whose existence is revealed by optical instruments.

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* *English Mechanic.*

In lately studying this subject, M. Janssen, the eminent French astronomer, was led to think that the inferiority referred to must be due rather to the mode followed hitherto, and not to the photographic method in its essence. Indeed, it seemed to him that photography should even have advantages over optical observation for showing effects and relations of light, which sight is incapable of perceiving or estimating. Thus, the sight does not enable us to judge of the relations of luminous intensity where the intensities are very great, as is the case with the solar image, in observing which, even with the intervention of coloured glasses, helioscopes, &c., the eye has to act under quite anomalous conditions. Hence the difference of opinion with regard to the forms and dimensions of the granulations and constituent parts of the solar surface. But, in the case of potography, the true relations of luminous intensity should be reproducible, provided the time of luminous action be regulated so as to avoid over-exposure for the more brilliant parts of the solar disc. Thus, the photographic image should be capable not only of accurate reproduction, but of instructing us about matters that might escape the eye.

Photography has another advantage (M. Janssen has found), especially in the case of brief exposure. The photographic spectrum is reduced, when the luminous action is short, to a narrow band situated near G. This curious action shows that very tolerable photographic images of the sun may be had with simple lenses of long focus; also, that chemical achromatism is much more easy to realise than optical achromatism, and that the images obtained, regard being had to this property, may have a much greater distinctness than optical images.

When the luminous action in photography is too much prolonged, relatively to its intensity, the photographic image is rapidly enlarged (as if by a kind of photographic irradiation), and loses all distinctness of contours. This is very striking in photographs of solar eclipses obtained since 1860. The images of the protuberances extend into the lunar disc 10 or 15 seconds or more. It is easy to see how solar granulations, which have an average diameter of 2 to 3 seconds, cannot be obtained in images when the photographic irradiation has a higher value than their dimensions.

M. Janssen has carefully studied the time of luminous action and its effects, and has combined diminution of the time with the enlargement of the images. The dimensions of the latter were successively increased to 12, 15, 20, 30 ctm. The time of action was reduced to 1-3000th of a second in summer. Special and delicate mechanism is required for such a short exposure, and for securing an equality of luminous action in the different parts of the image.

With such short exposure the image is much more latent than in ordinary circumstances. A slow development is necessary, and a final strengthening with pyrogallic and nitrate of silver. The various photographic operations have to be performed with great care, and especially the guncotton should be prepared at a high temperature, so as to give a layer of sufficient fineness. With such arrangements solar photographs are obtained (says M. Janssen), which, as compared with the old, constitute a new world. Let us look at some of the results, as regards the constitution of the photospheric layer.

The forms, dimensions, and distribution of the granulations presented do not agree with the ideas hitherto held regarding these elements, which are represented as having constant forms, reminding one of willow-leaves, rice-grains, &c. These forms, which may occur, are only exceptional, and cannot be regarded as expressing a general law of the constitution of the photospheric medium.

If we study (in the photographic image) the granulation where it is best formed, the grains are seen to have very varied forms—all, however, more or less approaching the spherical. This form is generally more pronounced the smaller the elements. In the very numerous grains where the forms are more or less irregular, these grains are seen to be formed by aggregation of smaller spherical elements. Similarly, where the granulation is less distinct, and where the grains appear drawn out, one perceives that the sphere has been the first form of these elements, which form has been more or less modified by acting on these bodies.

An important consequence from these considerations is the proof that the elements are formed of a very mobile matter, which yields readily to external actions. The liquid or gaseous state possesses such properties; but M. Janssen has reasons for supposing that the state of the granulations is very similar to that of our atmospheric clouds—*i.e.*, he regards them as formed of a dust of solid or liquid material floating in a gaseous medium.

If the solar layer forming the photosphere were in a state of perfect rest and equilibrium, the notion of its fluidity implies that it would form a continuous envelope round the solar nucleus. The granular elements would be merged in one another, and the brightness of the sun would be uniform throughout. But the ascending gaseous currents do not permit this perfect equilibrium. They break up the fluid layer, and produce the elements, which are simply fractions of the photospheric envelope. These fractional elements tend to take the spherical form by the gravity belonging to their constituent parts; but the state of individual equilibrium is but rarely realized. At numerous points currents drive the granular elements more or less strongly, and alter their globular form of equilibrium. These movements have points of election, so that the solar surface is divided into regions of relative calm and of relative activity. And at the points of relative calm there often occurs a driving in of the grains below the surface (through movements of the photospheric medium); hence, owing to the absorbent power of the medium, the great difference in brightness of the grains in the photographic image.

From the fact of the comparative rarity of the most brilliant grains in the photographic images, the author infers that the luminous power of the sun resides chiefly in a small number of points of its surface. If the solar surface were covered entirely with the brightest granular elements, which it shows, its luminous power would be ten to twenty times greater. It is evident (M. Janssen concludes) that the spots can no longer be considered as forming the principal element of the variations which the sun may undergo, and that it will be necessary to consider the variable number and luminous power of the granular elements which may here have a preponderating rôle.

ACIDITY AND ALKALINITY IN RELATION TO PHOTOGRAPHY.

BY DR. JULIUS SCHNAUSS.*

In the production of a collodion image the sensitiveness of photographic solutions is at its highest. It receives a practical value, chiefly from its application in taking direct impressions by means of the camera, which instrument has attained its present importance only on this account. Collodion positives called pannotypes, ferrotypes, or glass positives, according to the support, require, as is known, the shortest exposure. But as copies of these on paper cannot be made without a fresh photographic impression, they have little practical importance; still, as a good test of scrupulous cleanliness and accuracy, as well as of correctly prepared baths, they are worth the trouble of production in any studio, and are specially suited for the instruction of pupils; for here retouching, so useful in other cases in concealing faults in manipulation or slovenliness, fails; on the contrary, every blemish, every speck of dust, is represented on these positives in startling prominence. In order to get clear positives, the bath and developer should contain rather more free acid (the collodion rather more iodine) than in the negative process; intensifying is obviously impracticable, not counting as such the frequently proposed supplementary application of bichloride of mercury, which, moreover, acts only as a toning bath.

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* *Wochenblatt.*

The free nitric acid in the silver bath for direct positives ought to prevent every trace of a precipitation, except the precipitation of the pure silver molecules effected by the developer and the isolated iodo-bromide of silver. A developed image, however, consisting only of pure silver molecules, is seldom dense enough for copying purposes (*i.e.*, if considered as a negative). We get a hint from this, that for denser silver precipitates on wet—but especially dry—plates, we ought to use organic precipitates, either exclusively, or after the inorganic developer on intensifying the prepared image. The silver precipitate thus produced contains, indeed, greater or less admixture of organic products of decomposition in proportion to the greater or less predominance of an acid reaction in the solution employed, until it has finally been settled that strong alkalinity is advantageous in developing dry plates. In this extreme case, all inorganic developers containing a heavy metal—and other inorganic developers are unknown—are excluded on account of the precipitation of oxide which would take place. The co-operation of different organic substances in the production of collodion negatives has not yet received sufficient attention, although an important subject. If we could only take and develop a latent image on non-iodised collodion as on paper merely silvered!

In developing dry plates, then, a neutral, and even an alkaline, reaction, is of advantage. In working with wet plates, if we try to get as near as possible to the neutral point, and for that purpose use the pyrogallic developer, a peculiar phenomenon frequently appears, which has, of late, been almost entirely forgotten, but to get a clue to the origin of which would be very instructive in its solution of the enigmatical process of the formation of the latent image with iodide of silver. We refer to the method of preparation of direct transparent positives used in the past, especially by Dr. Sabatier. A more significant name is still wanting for this phenomenon, and would be desirable, to avoid confusion. It has probably happened to every operator to have the negative, after repeated intensification with silver solution and pyrogallic acid, assume in the negative shadows (consequently in the clear parts of the iodide of silver layer) a brown tint, very different from clouding. This phenomenon can easily be produced at will, and so completely that the negative, at first apparently faint, disappears, whilst a transparent positive of reddish-brown colour is formed, with all the details of the original.

We need only expose for a somewhat short time, using collodion with excess or iodide of cadmium, and a perfectly neutral silver bath; then we begin to develop with the ordinary pyrogallic developer made slightly acid with acetic acid, but stop before complete development by quickly washing with much distilled water, and pour a four per cent. neutral silver solution over the plate. This effects the sudden conversion of the negative into a transparent positive. The washing and fixing follow as usual. Obviously this silver precipitate, which is deposited in a remarkable manner on the clear parts of the negative, scarcely intensifying the barely visible negative, is mainly organic in character. A more minute investigation of this phenomenon should give results of great importance.

A quite similar coloration shows itself in the alkaline developing of the iodide of silver in dry plates, in the presence or absence of pyrogallic acid. In this case the organic character of the faint image is likewise evident, for even before the addition of any pyrogallic acid an action of the alkali takes place with the organic substances present to a great or less extent on all dry plates. Bromide of silver emulsion plates show a like phenomenon from a like cause on the first action of alkali. Whether bromide of silver is likewise capable of giving direct transparent positives in the camera does not appear to have been yet investigated.

Whilst in the negative process the question of alkalinity or acidity is of the greatest importance, we find also in the copying process a number of important actions, the results of which are very dependent on the reactions of the solutions. We may cite the fumigation of albumenized paper with ammonia, which, at the same time, requires a neutral reaction of the silver bath, while for the sake of durability of the silvered papers a feebly acid reaction in the bath is to be preferred; this is best maintained by addition of some citric acid. The alkalinity of the gold bath for albumen pictures is a case in point. It was customary before the use of albumen to use fully acid toning-baths. The albumen pictures took the gold tone with much more difficulty, on which account the presence of an alkaline salt in the gold bath is shown to be desirable, because alkaline gold solutions are more easily reduced.

Let us first glance at the different reactions of the preparations before and during copying.

The silver bath for albumenized paper ought to be neutral or feebly acid. As already remarked, the durability of the silvered paper is favourably affected by presence of a slight excess of acid; for the preparation of durable silver paper a considerable addition (or, better, a special bath) of citric acid is necessary. Even in the ammonia-fumigation process, in favour in American and English studios, the silver bath is not made alkaline, by which the albumen would be discoloured, while, on the contrary, it ought to be coagulated by the nitrate of silver. The ammonia forms nitrate of ammonium with the nitrate of silver in the silver bath; by subsequent addition of nitric acid the excess of ammonia can be removed, but the bath should not be allowed to become acid.

As an alkaline reaction favours, in general, the reduction of the oxides of the heavy metals, especially of the noble metals, so, too, light acts reducingly on the compounds of silver in albumenized paper. Hence, this paper becomes far more sensitive by fumigation with ammonia, and even if almost all the nitrate of silver were removed by washing the silvered paper, so that its sensitiveness were almost entirely destroyed, ammonia vapours would restore its sensitiveness (Haugk). In practice, evolution of ammonia in large quantity should be avoided during copying, as otherwise injurious action on the negative, the varnish, &c., might ensue. We have already touched above on the necessity of having an alkaline reaction in the gold bath for toning the albumen-copies, and will, in conclusion just mention that a bath of acetic acid, to which the albumen-copies are exposed after fixing, ought entirely to remove bubbles from them (Holzinger, *Photogr. Notizen*, N. 152). I would, however, enjoin that the pictures should, on coming from the hyposulphite bath, be first very carefully washed; as otherwise they would be quickly destroyed by the influence of the acid, and by the formation of sulphide of silver and sulphurous acid.

From the examples cited, we see how important is the acid or alkaline reaction of the different baths in its influence on all photographic processes. And we are very far from having exhausted here all the cases illustrating this influence.

CARBON PRINTING IN AMERICA.

Second Annual Exhibition of Lambert's Processes, New York.

The *St. Louis Practical Photographer* reports an interesting exhibition of carbon prints held in New York, as follows:—

"The second annual exhibition of permanent photographs, held here to-day, is undoubtedly a great success, and the largest and finest photographic exhibition ever held in this country. There are 1,497 exhibits from 142 exhibitors from almost every State in the Union, and every branch of photography was well represented.

"Noticing among the visitors the well-known veteran artist, Mr. Gurney, who, not being a carbon licencee, was quite disinterested, we thought his opinion worth recording, and we must say that Mr. Gurney's opinion of the chromotypes was very flattering, and that he admitted their superiority in beauty to silver prints.

"We expected to see a number of silver prints at the exhibition, as Mr. Lambert had freely invited competition; but we were disappointed in seeing no silver printing exhibits, except from the licencees, who had silver prints from the negatives from which their chromotypes had been printed for fair comparison, and it must be admitted that the chromotypes gained immensely by the comparison.

"The judges chosen were men of the most unimpeachable reputation, and old scientific photographic amateurs, being Prof. Draper, the renowned astronomer; Doctor Newton, President of the Photo Section, American Institute; and Mr. Fred. T. Thompson, the well-known banker. Both these gentlemen repeatedly expressed their admiration for the exhibits, and their surprise at the progress made in the year 1877 in carbon printing.

"There were beautiful exhibits from Europe, among which we noticed works by Braun, of Dornach; Liebert, of Paris; the Autotype Company, Vernon Heath, Faulkner, Sarony, Colonel Stuart Wortley, Greaves, Ferranti, &c., of London. These exhibits were not for competition.

"We are sorry to say that some very fine exhibits came too late for competition from Gentile, Tedjeda, McKecknie, Biddle, Burrell and Treeze, which would have increased the number of American exhibitors to 166.

"The judges report was as follows:—

"*To Messrs. Anthony & Co. New York, December 20th.*

"We, the undersigned having been called upon to act as judges upon the pictures exhibited by the pupils of Mr. Lambert (the same being in pigments and known as carbon pictures), express our admiration at their excellence of execution and beauty, and report as follows:—

"*Chromotypes.*—First prize, Illingworth, St. Paul's, Minn.; second prize, Ranger, Syracuse, N.Y.; third prize, Loeffler, Tompkinsville, N.Y.

"*Transparencies.*—First prize, Roche, New York; second prize, Barrett, Natick, Mass.

"*Enlargements.*—First prize, Clifford, St. Johnsbury, Vt.; second prize, Reinhold, Cincinnati, O.; third prize, Motes, Atlanta, Ga.

"*Porcelains.*—First prize, Dabbs, Pittsburg, Pa.; second prize, Barrett, Natick, Mass.

"*Change of Backgrounds.*—First prize, Lillienthal, New Orleans, La.; second prize, Lindop and Cooper, St. Thomas, Ont.

"*Landscape.*—First prize, Henderson, Montreal, Canada.

"*Single Transfer.*—First prize, Lamson, Portland, Me.

"Henry Draper,
"Henry J. Newton,
"Ferd. T. Thompson,
Committee."

"The first prizes are silver medals, the second and third prizes are bronze medals. The medals are the same size and designs as those of last year.

"The special Lambert silver medal for the best general display of the various Lambert's processes combined, was awarded by Mr. Lambert to Mr. Loeffler, Tompkinsville, L.I., N.Y.

"Mr. T. C. Roche, having been appointed referee by the licencees present to examine into the comparative merits of the various improvements for carbon printing during the year 1877, such improvements to be freely given to all the carbon licencees, reported as follows:—

"*To Mr. Lambert.* "*New York, Dec. 20th.*

"After careful examination into the comparative merits of the different inventions or improvements competing for the prizes offered by you for the best improvements in carbon printing in the year 1877, I have concluded to advise you to grant these prizes, as follows:—

"First prize ($200) to Messrs. Lindop and Cooper, St. Thomas, Ontario, for their 'Universal Self-feeding Photometer.'

"Second prize ($100) to Mr. Howard, of Plattsburgh, N.Y., for his 'Automatic Carbon-developing Trough.'

"First diploma of merit to Mr. Inglis, Montreal, Canada, for his 'Combination Printing Registers.'

"Second diploma of merit to Mr. Zay, of Findlay, O., for his 'Chromotype Isolator.'

"Third diploma of merit to Dr. Mills, Penn Yan, N.Y., for 'Improvements in Manipulations Without Squeegees.'

"T. C. Roche."

"The licencees have decided to form immediately a 'Carbon Society for Mutual Improvement,' and have decided to hold their third annual exhibition in September, 1878, to which silver printers will be freely invited to compete, as they have not responded to Mr. Lambert's invitation this year.

"There are now 314 working licencees and 36 amateur licencees of the Lambert processes in the United States and Canada, over half of the photographers having licences having exhibited this year. Should the silver printers respond to a call for a general competitive exhibition for 1878, as did the Lambert's licencees this year, carbon will be represented by about 200 exhibitors, while silver will have 3,200 representatives, thus forming the largest exhibition in the world. If carbon, with only eighteen months' existence, can furnish one exhibitor for every two licencees, surely silver, which has over twenty years' experience on its side, ought to furnish one exhibitor to every two galleries, principally as the licencees offer to meet half the expenses of such an exhibition, which may become the means of reviving the 'National Photographic Association,' in which could be represented the interests of both carbon and silver printing."

HINTS TO FERROTYPISTS.

BY J. R. APPLEGATE.*

We have been using the same bath solution, or a portion of it, for the last six years. We never boil down a bath or solution, but renew it occasionally; then it works the same as new, or better. When we see any signs of about to give out, such as weak impressions, sandy appearance on the plate, requiring longer time to sit, or flat picture, then we add the same amount of water that we have bath solution, then filter and throw in enough silver to make the bath 25 to 30 grains strong, test, filter again, and it is ready for use. We never use anything but silver and hydrant water, and never have a bath that shows any signs of fog. We find a solution of 25 grains works better than one of forty. For ferrotypes, we often use as strong a bath as 30 grains, but never stronger. By this means we are not troubled with defacing the picture, which is often the case by using the softest brush in colouring. When we use a bath of forty grains strong, we always use larger baths, and never let the dipper touch the bottom of it, but let it reach within about three inches, leaving plenty of room for any sediment that may get in the bath to settle. By so doing, we seldom filter the bath, not oftener on an average than once in two months. We dip sometimes as many as two to three hundred plates a day. This not boiling down bath is a saving in the breakage of evaporating dishes, baths, &c., enough to provide us a good lunch occasionally. We find all makers of collodion work about the same, and the common iron developer we find no fault with. Strong cyanide clears up more brilliant than anything, but be careful in using it, for it may be death to the careless. We find any make of ferrotype varnish good, but slightly warm your plate before pouring it on. There is more money and less trouble in the plate picture business than the photographic business, especially when you don't run down the prices to bottom rock.

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* *St. Louis Practical Photographer.*

EXPERIMENTS WITH YELLOW CHRYSOIDINE VARNISH.

BY DR. H. VOGEL.*

Chrysoidine has lately been suggested for the production of a yellow varnish, either for rendering negatives more dense, or for staining dark room windows, its tint being more non-actinic than gum tragacanth. Chrysoidine is a yellow colouring substance that is easily dissolved in alcohol. Forty cubic centimetres of varnish treated with 0·6 gramme of chrysoidine becomes of an intense brown colour, and gives, when applied to glass, a dark yellowish red film which appears darker than ordinary yellow glass. The chrysoidine varnish, therefore, seemed to promise better results than yellow glass, especially as it more effectually cut off the green and blue rays in the spectroscope than the yellow fabric or tammy which I usually employ instead of glass.

Experiment proved, however, that a glass plate covered on both sides with the yellow chrysoidine varnish still permitted a large quantity of active light to pass; a landscape, indeed, was taken through such a plate (held before the lens) there being a perceptible image after an exposure of two and a-half minutes. As we know very well, however, the yellow fabric or tammy above referred to also allows a perceptible quantity of active rays to pass in bright weather through it, forming a fog upon the plates, unless we take the precaution of shading our dark-window.

An eight by ten-inch plate coated on both sides with chrysoidine varnish had the effect of fogging a plate, according to M. Zipan's experiments, when the latter was held at a distance of one metre from the dark-window; the chrysoidine dark window, however, did not have this effect when the plate was handled at two metres distance.

To find out the difference between yellow tammy and chrysoidine plates in regard to their capacity of holding back active rays, a stereoscopic camera was taken, and the lenses screwed out. One of the openings was then closed with yellow tammy, and the other with a glass coated on both sides with chrysoidine varnish; the camera was then put against a window, and a double wet plate exposed. The result was that the double chrysoidine film, even against a grey sky, caused a fogging of the collodion film in one and a-half minutes, while the much lighter double covering of tammy preserved the film from action entirely.

From this it may be inferred that chrysoidine varnish appears darker, and in the spectroscope absorbs green rays more readily than yellow tammy; while, on the other hand, the varnish permits more blue or actinic light to pass than the tammy. On account of the insensitiveness of the eye for blue in the spectroscope, this colour can hardly be criticised with the eye, but its value is at once appreciated by a photographic plate. If M. Bardy, therefore, has employed with success chrysoidine varnish for the dark room window, it may have been because he used the varnish not upon glass, but upon paper, which is less transparent than glass, and absorbs fifty per cent. more light.

It is well known that a solution of red bichromate of potash absorbs blue rays very readily. With this substance I made several experiments. A layer of bichromate of potash solution in a glass vessel having parallel sides was taken, the layer being one centimetre in thickness. (The solution was made by dissolving one part of the salt in twelve parts of water). The layer appeared more lightly coloured and yellower than the double chrysoidin film, and yet it gave better protection. A plate exposed behind the bichromate layer showed no trace of fog after being in the camera two minutes and a-half.

Therefore the dark reddish yellow films do not hinder the passage of active rays so much as lighter and more yellow mediums, which are the best protectives.

The chrysoidine varnish is, however, very valuable, I have found, for rendering negatives more dense.

PROOFS, DODGES, ETC.

BY G. H. SHERMAN.*

There is no branch of any profession but has its difficulties and trials, which oftentimes try the patience of its votaries. Especially is it the case in the photographic profession. In ordinary trade and traffic you touch the pocket, whereas in the portrait business it is the pocket and features with which you come in contact, and of which all are more or less sensitive. All want the worth of their money, and all want to look well, if not handsome. Moreover, man's faith in man is not so universal as will lead him to put implicit confidence in his assertions at all times. Thus we have been forced, as it were, into the making of proofs. People want to be sure that they are getting the worth of their money, and also that they are not caricatured. But the ordinary way of making proofs by slight printing from an un-retouched negative does not fill the bill in all cases; and to retouch a negative upon an uncertainty is not a paying way in these days of low prices, and is, I think, not generally practised.

The question is, what better way is there, and what else can we do? I will tell you my way. It may not be new to some, but I think it will be to many. In the first place, after exposing and developing the plate, I wash clean of all developer, and fix with cyanide. Before drying, float upon the plate a weak solution of chloride of gold, just enough to cover the image, and let it remain until it comes out in bold relief like an ambrotype. After the image is brought out sufficiently, I then show it to the sitter and friends. They can see it as well as a ferrotype, and if they desire any change in position, or other alterations, then and there is the "time and place" to make them. I find no trouble in satisfying my customers, as they feel it a relief to know that they will not have to fix up and come again. This process is a great tonic; it not only strengthens a weak negative, but it tones up a man's courage to go on with his work, knowing that he has a sure thing. This is a dodge I have successfully used for years to my own and my customers' satisfaction. The proof business is certainly a nuisance, if you have to retouch before proof is made.

Now a word about carbon. Much has been said *pro* and *con* about the carbon process. I have worked it over a year, and have had no serious difficulty with it. Indeed, I must say that I am in love with it, and I cannot help thinking it is the picture of the future. There may be changes and improvements in materials and manipulations, but the permanency of the thing is what tells. To create an interest in the subject among my friends and patrons, and being a member of the scientific society of this city, I brought the subject before the society in a paper, and also demonstrated the working of the process from beginning to end. The members seemed delighted, and requested a repetition of it at a future time.

I had a letter from one carbon worker complaining of the sticking of the print on the glass. I had the same trouble at first, and overcame the same by using Anthony's porcelain instead of glass. Now, let us give this carbon child a fair trial; certainly, if it is good for naught, it will die of itself, and needs no kicking.

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* *Photographisches Mittheilungen.*

* *St. Louis Practical Photographer.*

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A SPRING EXHIBITION OF PHOTOGRAPHS.

THERE are not two opinions, we apprehend, as to the value of exhibitions of pictures as aids to art progress. Such exhibitions perform a manifold function. They are valuable as displaying examples of good work, and thus showing what should be done or aimed at; and they afford a powerful stimulus to try to do it. In these and other modes they are valuable to artists. To the public they are valuable as affording landmarks of progress. They show what has been done in an especial art, and what is doing, and who is doing it. In regard to paintings, they furnish the artists with their best market. A picture hung in the exhibition room of the Royal Academy, and in degree in the various minor exhibitions, comes under the attention of many hundreds of possible buyers, and of many more connoisseurs whose opinions influence buyers. In an exhibition of photographs the facts are not precisely the same. A photographic exhibition as an aid to progress is just as important; it affords to the devotees of the art examples of the best work which has been achieved, and affords a strong incentive to produce something as good, or better. It is true, it is not so essentially a market, inasmuch as the pictures are not, as a rule, intended for sale; but it does make the public familiar with the capacities of the art, and its current state of progress, and it also enables them to ascertain who are the men who do the best work, and thus materially affects the business interests of the exhibitors.

For various reasons, the exhibitions of photographs have, as a rule, been held in autumn or winter; very often in the most gloomy and unfavourable month of the year —November—a month in which the light is so bad in London, that it is impossible frequently to see the exhibited pictures to any advantage; a month in which comparatively few of the fashionable world are in town; a month in which everybody who is in town is anxious to avoid the streets—the most unfavourable month, almost, in every aspect, for a public exhibition. Amongst the reasons that have prevailed in favour of this unsuitable season for a photographic exhibition, one is found in the fact that almost all the exhibition halls available in London are engaged, and have been for years back, for spring exhibitions of paintings, and not to be secured at the time for photographic exhibitions. Winter exhibitions only have, as a fact, been available. Some other reasons have existed, but this has been, we believe, the primary one, and has been in itself sufficient.

A somewhat unusual project has, however, just been put forward, to make a spring exhibition available to photographers. We speak of the project as unusual—we might have phrased it as unparalleled, inasmuch as it involves the offer, by a professional photographer, of galleries forming part of his business premises, to photographers at large, for an exhibition of their productions to the public! The case stands thus: Mr. Alexander Bassano, an English photographer, although bearing an Italian name, who, by considerable art ability and business tact, has secured very great success, has issued a circular to photographers proposing the experiment of a photographic exhibition during the best part of the London season, not as antagonistic, but as supplementary, to that held by the Photographic Society in winter; and he places two large exhibition galleries, belonging to his business premises in Bond Street, at disposal for such an exhibition, on, we were going to say, very reasonable terms; but, in truth, there are practically no terms at all. There appears to be neither cost nor responsibility of any kind for the exhibitor! We shall best acquaint our readers with the details of the project by quoting part of the circular letter issued.

"*25, Old Bond Street, London.*

"It has ever been a source of the greatest regret to the profession that an exhibition of the works of well-known and distinguished photographers has not been established in London during the height of the London season, when every other exhibition of art and science is prominently before the public. Unfortunately, the only exhibition we have occurs during the dreariest month of the year, November; dreariest not only in want of light, but because every member and patron of the art-world is either away from London, or disinclined to consider art matters at so unfavourable a season. There are, no doubt, good reasons why the conductors of the Photographic Exhibition choose the Autumn for the annual display of the examples of our art, yet it cannot be considered anything but unfortunate that the Exhibition does not take place at a time when London is full both of connoisseurs and patrons of art.

"I now come to the proposal I have the pleasure to make.

"The above premises, which I occupy, are large, commodious, and central, immediately adjacent to the Royal Academy and all the well-known Art Galleries. I have two (and probably three will be available) large galleries built specially for the exhibition of pictures, with splendid light and ample wall space, and which have already a wide reputation as exhibition rooms. I am prepared to open these galleries for the free reception of works of photographic art, either by professional artists or by amateurs. I propose to open this First Annual Exhibition during the early part of the ensuing season, and to continue it until the season closes.

"The public will be admitted to the Exhibition on payment of 1s., which admission fee will include a catalogue, and it is anticipated that the sum derived from this source will meet the charges for advertisments, catalogues, and other minor incidental expenses. Should there still remain, at the close of the Exhibition, a sum in hand over and above these imperative costs, such surplus will be presented to the funds of the Photographers' Benevolent Association. This undertaking, I trust, will prove that I have no personal interests to serve in making the present proposal; my object being simply that an Exhibition of Photographs may be placed before the public at the most favourable season of the year."

To us this project appears to be eminently disinterested. We know that many will be ready to exclaim that the exhibition will simply be auxiliary to the business conducted on the premises—that a large clientelle of persons interested in photography will be brought to the premises, and the custom of many of them secured by the projector of the scheme. It is just worth while, however, to glance at other aspects of the case. A large concourse of persons interested in photography would doubtless be brought to the exhibition rooms, and hence practically brought into contact with Mr. Bassano's business premises. But unless Mr. Bassano's work excel in excellence all that on view at the Exhibition, the contact with visitors can be of but little value. It shows very large faith in his own work, or rare feelings of liberality to his professional brethren, to be quite willing to afford them opportunities of comparison by showing their own best work—as exhibition work usually is—in contact with his work done in the ordinary course of business. If the work of Mr. Bassano be better than that of the best of the exhibitors he will have, indeed, everything to gain by the comparison. And there are few photographers, we apprehend, who are not catholic and generous enough to exclaim, "Let the best man win!'

We cannot but think, however, looking at the matter all around, and quite dispassionately, that the project is a disinterested one, involving a good deal of public spirit, and that giving the profits, should any accrue, to the Photographer's Benevolent Association, Mr Bassano has a right to say that he has no personal interests to serve in making this proposal. Beyond the information contained in the circular we have no knowledge of the project whatever, having had no communication on the subject, and must refer our readers to Mr. Bassano for any further details of the matter. We shall, however, place any further information which reaches us before our readers in due time.

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ON CERAMIC ENAMELS.

BY NELSON K. CHERRILL.

No. II.

To use the enamel toning bath proceed as follows :—Pour some out into a clean dish to the depth of about half an inch, stand near to this a large dish filled to the depth of one inch with clean water, and also a small dish with pieces of glass in it under water ; the glasses may be about quarter-plate size, or such as will be found most convenient. Now take up one of these glasses, and slip it under the film containing a transparency to be toned, gently raise the glass to the surface (at the same time manipulating the film with a camel's hair-brush, held in the right hand) in such a manner that when the glass and film on it are lifted out of the water, there will be an edge of film (say) a quarter of an inch wide lapping over one edge of the glass. The action of the water, as the plate is taken out, will wash this piece or edge of film round to the back of the plate, and, by so doing, will fix the transparency on the glass in a very satisfactory manner. If care be taken that the edge where the film laps over is kept uppermost, or highest, a very considerable stream of water may be poured on the film without any danger of it slipping. Having got the film on the glass, it should be rinsed under the tap in the manner just suggested, and the film may then immediately be transferred to the toning bath. To do this, turn the glass over so that the body of the film is underneath, lower it gently under the surface of the solution, and, with a brush, disengage the lap of film where it had turned the edge of the plate, now, of course, uppermost. As soon as this is done, the film will move off into the solution free of glass, which can then be removed. When the film has floated free for about a minute, turn it over with the brush, and note carefully if the deepest shadows are toned through, so as to give one uniform tint to the whole film. Turn the film over and over, and move it about till this is effected, and, as soon as it is so, remove it from the bath by the same piece of glass, used in the same manner, *i.e.*, securing the film by making a little piece of it lap over to the back along one edge of the glass. Let the film drain a few moments, and then transfer it to the large dish of clean water. As soon as it is free of the glass in this dish, gently agitate the water with a brush, so as to wash away the toning solution still adherent to the film.

I strongly object at this stage to washing the film under a tap—dish washing is far preferable, and as little of that as possible should be employed. As each print is toned in succession it is placed in the same large dish of water. I use one that will take a half-sheet of paper. When all are finished so far, change them one by one into another dish of water, taking up each film with the glass as before described. This is all the washing they are to have. Now proceed to mount them on the tablets. First of all, pour back the toning bath and put away the dish it was used in, then set before you on the table two dishes, one filled about half an inch deep with ammonia solution, and the other about the same depth with clean water.

Formula for the ammonia solution :—

Ammonia solution at 880° ... 6 drachms
Water ... ... 12 ounces.
(This must be kept well corked.)

Half an ounce of this mixture, diluted with one pint of water, makes the bath into which the films are to be plunged.

Get a chair and sit down to the work, as it is far easier to manipulate the films if both arms can rest on the table. Take off your watch and place it before you, so that you can see it as you work. Now place in the dish of clean water a clean glass, and on that an enamel tablet, carefully washed previously. Now take another clean glass, and with it remove one of the toned films from the dish in which it was washed, and plunge the same into the ammonia bath. As the film enters the solution take the time by the seconds hand of the watch, and withdraw the film when it has been in twenty seconds; plunge it as rapidly as possible into the water where the tablet is, disengage the glass, and slightly agitate the water in the dish to give the film a sort of wash. Now take up, with the left hand, the piece of glass on which the tablet rests, and raise it, about half way to the surface; then, manipulating with the brush, held in the right hand, bring the film to its proper position over the tablet. By raising the latter very gradually the film can be laid in its place in this way with the utmost certainty. As soon as the glass is fairly out of the water, place it with one edge raised a little, so as to drain. If the glass is placed at too steep an angle there is danger that the tablet will slip out, or, at any rate, get disarranged.

It is proper to note, in this place, that the tablets being curved, the films will not lie flat without the exercise of a little care on the part of the operator. Care must be taken to avoid the formation of *one* ridge or *two* around the edges of the tablet, but the spare film should be made to lie as nearly as possible *equally* in all directions. If this is done with care, no puckers or laps will be found in the film when it is completed in the next stage of the proceedings. When the films have got almost surface-dry, the tablets are to be removed from the glass plates on which they were lifted from the water. To do this, place the plate level, and, with a sharp-pointed stick, tear away the useless film around the edges of the tablet, slip a thin knife under the tablet, and lift it off the glass on to a sheet of blotting-paper, and at once cover it with a large bell jar, or other glass vessel, to protect it from dust and accident.

The picture is now ready for burning, and it should at this stage look like a finished enamel, and be as perfect in every respect, in the matter of light and shade and tone, &c., only it will be of a bluer shade of colour than the finished result; but it ought to have the same relative shade of colour now as it is to have in the completed result. The tablet may be burned at once, or left many days, or even weeks, without change.

I much prefer a gas muffle furnace, for burning the enamels in, to one heated by coke ; whichever is used, it should be ready and at the full heat, a clear cherry red inclining to white, but by no means a full white heat; too much heat is a mistake, as it renders the process unmanageable, and produces no good result to make up for the extra difficulty of work.

The burning is a most delicate operation, and all the care and attention of the artist are required to secure the result at its very best point; still, with care, I do not hesitate to say that nine out of ten enamels can be burnt to a successful issue.

Take up one of the tablets and place it on a piece of fire-clay in front of the muffle, but not too near, say at a distance of about six or eight inches. The fire-clay should be supported in such a manner as to tip the enamel towards the heat, so that the rays may fall upon it, as near as may be equally all over it. When it has been roasted in this manner a little while, move it a little nearer, and then a little nearer, examining it each time. As soon as the action of the heat has turned the colour of the film brown in the least degree, it may be dealt with fearlessly; the fire-clay, with the enamel on it, may then be placed level, just in the mouth of the muffle, where in a few moments the film will take all the shades of brown till it gets quite dark all over; now push it into the heat. (A wire set in a wooden handle, and with about half-an-inch at the other end bent to a right angle, is a most useful tool in manipulating the fire-clay plates when in the muffle). As soon as the plate is in the heat, watch it with great care; it will seem to get perfectly black all over, and then almost on a sudden the whites of the picture will be seen coming out quite clear; the moment this takes place, draw the tablet towards the mouth of the muffle, and remove it to the outside to cool a little gradually, and then take the tablet right away and place it on wood to get cold. All beauty will by this time have disappeared from the enamel, the whites will stand out, and the few tones next to them will have some clearness, but all the other tones will be a dark and confused mass—hardly distinguishable the one from the other. This is the true characteristic of a good enamel at this stage. It is now ready to glaze.

(To be continued.)

ON THE PRODUCTION OF REVERSE NEGATIVES.

BY A. PUMPHREY.

In the practice of holiographic printing, I have had during the past twelve months to put to practical trial the various methods of producing these. My experience may be of service to others.

Reverse negatives may be devided into three kinds: those taken direct, those turned, and those taken from the plate, which can be used either to print reverse or as ordinary. The simplest method of taking direct is to take through the glass supporting the film; the drawback to this I have found to be a want of accurate definition, which I could not overcome. The use of a true plate of glass, with a coating of pure silver, answers perfectly, so long as the surface keeps bright, and answers for gallery work, but the increased bulk of the apparatus, and its liability to injury, have made me abandon the plan for outdoor work.

The use of a right-angle prism is quite satisfactory applied to single lenses, in which case one of moderate size answers, and I retain it for occasional use. On the whole, I prefer the plan of taking a negative the ordinary way, and then turning or converting it into a film, which can be printed from either side.

The plans I propose for doing this are the use of collodion, gelatine, or gelatine on paper, or gelatine and collodion, or gelatine with varnish. With collodion, the negative produced in the ordinary way is first coated with some medium which will print, the second coat of collodion affecting the first with the picture upon it; a solution of india-rubber I have found better than anything else, this followed by a coat of collodion; and when this is quite dry, the whole can be peeled from the plate. I have never had any difficulty, beyond the great tendency of such films to curl, which is such a great inconvenience in printing that I have abandoned the use in this way. With gelatine alone poured upon the negative, and allowed to dry either spontaneously or in a well regulated heat, the resulting film is much better to handle than the collodion, in not being liable to curl; but sometimes the gelatine causes the film to adhere to the glass; no doubt, with a little care, this could be overcome. Paper coated with gelatine, soaked in water, and brought in contact with the negative, is a simple and certain method of inverting, but such negatives always take longer to print, and the process of printing cannot be watched from the surface, which is often of value. On the whole, I have settled down to the two methods which follow:—The use of collodion and gelatine, and varnish and gelatine.

Coat the negative with a thin solution of india-rubber of about the consistency of ordinary collodion. It is made by procuring what is known as cut sheet rubber, which has undergone the process of mastication prior to being cut into sheets. Make a thick solution by covering a little of it with pure benzole; allow the matter to swell and become quite soft. This will take a day or two to do. Then add sufficient to this thick paste of a further portion of benzole, allowing it a day or two to settle; allow the coating of india-rubber to dry, which it will do in half an hour; follow with a coat of plain collodion; allow this plenty of time to dry—at least two hours. Before attempting the removal of the film, have a plate ready to receive the film. The plate is prepared with a thin coating of gelatine, two ounces of gelatine to three ounces of water; the gelatine must be dissolved with a gentle heat, and the plate put by till quite dry. These plates can be prepared and kept in stock. Having one of these plates at hand, place the negative in a dish of cold water, passing a keen knife all round the negative, about the eighth of an inch from the edge; in a few minutes the film may be lifted, but it is best to leave it at least half an hour. There will then be no difficulty in the film loosing. The film is gently turned backwards over the plate; should it adhere at any place, turn the film from another side.

One advantage of this plan is, that no violence is done to the negative, and you can see as you go along that all is going well. When the film is quite free from the plate on which it has taken (and I have never had a failure), soak the plate prepared with gelatine in cold water for about four minutes, place it in an inclined position one end under the film which has been turned over, and draw the film out of the water up to the gelatinized surface of the glass. This plan gets rid of all trouble of specks and bubbles, and is applicable to large-sized negatives as well as small. Allow the negative to dry in a horizontal position, and, when quite dry, varnish. With gelatine and varnish, a film can be made which is free from tendency to curl, and at the same time comes away from the plate with certainty, if proper precautions are observed. Varnish the negative with varnish made from some gum which is soluble in acetic acid; the French Sœhene is good, as is also a shellac varnish. Take two ounces of gelatine, six ounces of water, allow the gelatine to soak the water, then add three ounces of glacial acetic acid. This will make the whole fluid without the addition of heat. Allow it to stand an hour or two, adding four drops of glycerine. It will become quite free from bubbles. Then, having the negative set quite level on a large glass plate, pour on half an ounce of the gelatine for (say) twenty square inches. Allow the whole to dry in a room of not a higher temperature than 60°. When the plate is dry enough to allow you to pass your hand over the surface without any tackiness being felt. it is ready for removal from the plate. Pass a knife under the film, and it will leave, if not too dry. This is the part that requires care. If the plate is allowed to get too dry, it will not leave the glass, but taken at the time when the surface only is dry, it comes away without difficulty; the film does not contract, and can be printed from either side.

FRENCH CORRESPONDENCE.

M. Peligot Re-elected President—M. Berthaud's Greasy-Ink Photographs—Leon Vidal's Photo-Chromes: Employment of the Woodbury Process in Producing the Superposed Image—Albumenized Paper for Retouching—Reproduction Drawings and Tracings by Direct Printing—M. Liebert on Residues.

The French Photographic Society held on Friday last, the 1st of February, its ordinary monthly meeting. After the annual report of the council had been read, the election of that body was proceeded with, together with that of the president. M. Peligot, the former president, was once more chosen to preside.

M. Berthaud exhibited a large series of prints in greasy ink as remarkable for their delicacy as for their modelling and large dimensions. Although one of the most recent to adopt this new method of printing, M. Berthaud proved himself by no means an unskilful practician in this branch of photography.

M. Leon Vidal forwarded, with a letter of explanation, the five first examples of a magnificent work of which the office of the *Moniteur Universel* has undertaken the publication under the title of "Tresor Artistique de la France." Besides the letter-press, written by some of the best French authors, in magnificent type, the volumes contain several plates in photochromie and phototype, representing the most precious objects of our national museums. The copies presented to the Society include the following pictures:—The casket of St. Louis (in colours); the shield and casque of Henri the Second (black); the sceptre of Charlemagne (in colours); a platter and ewer of Charles the Fifth; the headdress of Anne of Austria; the mantle of St. Louis (in colours); and many enamels of various kinds—all admirably reproduced. M. Leon Vidal remarked that, as a means of faithfully and perfectly reproducing works of art of this nature, the process of photoglyptie plays an important rôle. It is this process which has been substituted for carbon printing in the production of the monochrome images, which enter into the composition of his photochromic prints; this modification rendering the execution of the pictures much more regular and complete. The adoption of photoglyptic printing (the Woodbury photo-relief process) has also the effect of sensibly diminishing the cost of these beautiful pictures. The communication of M. Vidal, naturally enough, was received with great interest among the members and visitors who assisted at the meeting.

MM. de Potocki and Giraud submitted to the Society some specimens of a new kind of paper destined for the printing of portraits which are subsequently to be retouched. The surface of this paper takes colours very easily. It is called *papier-torchou*, and is well known among draughtsmen and water-colour artists. It is treated exactly like ordinary Rive or Saxe paper—that is to say, albumenized and sensitized by the ordinary methods, and printed also in the same way. The pictures must not, however, be over-printed. The best fixing agent is sulphocyanide of ammonium. In fixing with hyposulphite of soda, the paper comes out of the bath rather yellow, and a thorough washing in chlorine water must then be given. This last operation, too, has to be undertaken with a good deal of precaution, since chlorine easily attacks the image. When the picture is finished, then it may be charmingly coloured by the aid of polychromic crayons. Some pictures coloured in this way were sent for the inspection of the members of the Society.

The same gentleman also showed some pictures printed in black upon white, without the aid of a photographic cliche, but direct from drawings and tracings, such as employed by architects, engineers, &c.

M. Pellet also exhibited some specimens of the same kind, printed, however, in blue upon a white ground, like those produced with ferro-prussiate, with which we have been familiar for a long time past. M. Pellet gave a demonstration before the Society of the details of his process. Finally, M. Delagrave exhibited a lantern which he termed a "lampodorama," and which much resembled the lampascopes and other well-known forms of lantern.

A communication had been announced from M. Ducos du Hauron, on the subject of his heliochromic process, but at the advanced hour at which we quitted the meeting this had not been made.

Finally, M. Darlot presented a new form of rapid hemispheric lens, about which many good things were said.

In reply to a communication which we forwarded to M. Liébert on the question of the treatment of residues, we have received a few notes which, doubtless, the readers of the Photographic News will be agreeable to have placed before them. M. Liebert is not altogether in accord with the principle of the theory which says we ought to recover about seventy-five per cent. of the precious metals gold and silver employed in the printing of albumenized pictures. M. Liebert divides the residues into three categories:—1. The ashes coming from burnt paper cuttings, toned and untoned, filter papers, &c. 2. The chloride extracted from washings before fixing, old baths, whether negative or positive, &c., precipitated by the aid of hydrochloric acid. 3. The sulphide of silver obtained by a precipitate of sulphide potassium from the hyposulphite solutions. There is a fourth category comprising the old toning solutions, which M. Liebert precipitates separately with iron salts, in order to recover the gold. Finally, the residues of the laboratory, which have to be specially treated. The ashes, well cleaned and thoroughly burned, are mixed together with the chlorides and laboratory residues and gold precipitates, and the whole well dried. The yield on average of the whole is about fifty-five per cent. of metallic silver. As to the sulphides, which must first of all be thoroughly roasted, before further treatment, M. Liebert has never been able to secure more than thirty-five per cent. of metallic silver out of the whole weight put into the crucible.

Ernest Lacan.

PHOTOGRAPHY IN GERMANY.

BY ERNEST DUBY.

Reader, should you like to make printing-vignettes? Well, then, please to do as I shall teach you.

First, *make a negative.* Take some sheets of *white* and some of *black* cardboard, and cut out of them about half a dozen ovals exactly in the shape you desire in your vignettes; but, remark well, the size of the ovals must be *gradually increasing*, so that if your first be five inches large, the last must be about nine. Now, you take the smallest one of these discs (which must be a *white one*) and fasten in the centre of its back a staff, so that it stands vertically to the disc. Afterwards you take the following disc (the second in size—a *black* one), and draw it on the staff in such a manner that it remains at a distance of about one centimetre from the first, the direction of both being parallel; then, again, a *white* one, and then a *black* one, and again a *white* and again a *black* one. Now, if you fasten this staff in a *horizontal* direction to the wall, the smallest of the discs will be next to you, and the largest next to the wall; and, if you take care to let the staff always pass through the *centre* of every disc, this whole system of discs will, if looked at from before, have almost the appearance of a vignette, provided that you always take the following disc larger than the precedent. This done, take with your camera and your lenses a good negative of this system of discs, but you must focus so that *no border will appear distinctly*, and then you have the negative of a vignette in whatever size you like.

To make its *positive* you must do as follows:—Take a clean crown-glass pane, and rub it with some ox-gall. Afterwards coat thickly with a solution of good gelatine, with addition of a small portion of *tri*-chromate of potash. For this purpose, the *bi*-chromate of this metal would not do—it must be its *tri*-chromate. When the film is dry, expose under the negative, printing very deeply, then wash out with *cold* water, adding to it at last some drops of nitric acid; then immerse the plate in a solution of alum (four per cent.), wash, and let dry.

Should you want to have your vignettes *infrangible*, then you must rub your glass-pane before coating it with the gelatine solution, first with some turpentine oil, and afterwards with some talc; then, if you cut the borders of the produced vignette picture with a knife, it will be easily drawn off from the glass, and you will have an *infrangible gelatine vignette.*

For producing the *infrangible gelatine vignette* I have, by combining different methods, succeeded in finding out one that may also be worthy of recommendation. Here it is:—I rub a crown-glass pane, as usual, with turpentine, oil, and talc, and afterwards prepare a solution of gelatine, to which I add a few drops of chrome-alum, in order to make the gelatine insoluble. With that I coat the pane very thickly, and allow the gelatine to dry, the pane lying quite horizontally. Meanwhile, I take with some carbon tissue a copy of the negative, lay it in cold water, and then on a clean glass pane, treating the back of the copy with the squeegee. Then it must, during one or two minutes, be immersed into an alcoholic solution of *white shellac*, and laid on the before-mentioned and duly dried gelatine film on the glass pane. Pass over the back of the picture with the squeegee, press it for about half an hour, and then develop in warm water. When tanned with alum and dried, the carbon-vignette will be found to stick closely to the gelatine, and if you cut the border of the pane with a knife you will be able to take your gelatine-vignette off, and have full satisfaction with it.

INSTANTANEOUS PICTURES.

BY TORPEDO.*

Before describing my way of manipulating, I beg to say a few words on the lens to be used. A short focus lens, giving good definition with the largest diaphragm, is well adapted for stereo. views; while for larger work, as eight by ten plates, Dallmeyer's rapid rectilinear answers admirably. The lenses should invariably be used with full openings, to secure the passage of the greatest amount of light in a comparatively very short time. To better regulate the duration of exposure, a self-acting shutter is desirable. This is easily made out of wood or cardboard, and every photographer of average ingenuity will be able to devise some practical contrivance for himself. The time of exposure, of course, varies for moving objects with the distance, the velocity of motion, &c.; but as a general thing from one-sixteenth to one-eighth of a second will give satisfaction. That a bright, clear day is essential, and the hours from ten a.m. to two p.m. should be chosen, every photographer will understand. Less generally known, however, is, perhaps, the fact that some fleecy clouds in the sky opposite the camera, as also a gentle western breeze, increase the chances for success materially.

Too great care cannot be used in preparing the plates. They should be absolutely clean on both sides, and freshly albumenized, as, owing to the rapid action of the powerful developer stains and streaks will frequently arise from the albumen substratum being decomposed.

The nitrate bath contains forty grains of silver to the ounce, and is slightly acid with nitric acid. Iodising is done by immersing a large collodionized plate in it for a night. To saturate the bath with silver carbonate, and then re-acidifying it, is of advantage, as far as it prevents pinholes and keeps the shadows clear, but on the sensitiveness of the plates it does not seem to have any effect.

A very sensitive collodion, and one which also answers well for landscape and studio work, is made after the following formula:—

Alcohol (95°)	½ ounce
Sulph. ether (0·72)	½ ,,
Anthony's climax cotton... ...	6 grains
Ammonia iod.	2½ ,,
Cadmium iod.	2½ ,,
Cadmium brom.	4 ,,

Dissolve the iodizers in the alcohol, then add the cotton, and finally the ether. Shake until clear; no precipitate should form. The collodion should be of a slightly yellowish colour to give the best results, and should therefore be mixed at least two months before use. If this precaution be not taken, crape-markings may result from the large amount of cadmium. The developer consists of:—

Double sulphate of iron and ammonia ...	35 grs.
Sulphate of copper	12 ,,
Acid acetic glacial	15 to 25 min.
Ammonia conc.	1 ,,
Alcohol	20 ,,
Water	1 ounce

Immediately before application a few drops of a strong solution of nitrate of lead, or acetate of lead in distilled water, should be added.

As an instantaneous plate, if successfully taken, is something worth keeping for a longer time than is usual with other negatives, potassium cyanide should be used for fixing; for, if hypo be taken and the plate not be washed profusely, traces of the salt will be left in the film, and the latter will, in course of time, begin to crack and split, as a number of negatives just before me bear testimony.

Intensification, if necessary, is done in the usual way. I prefer doing it after fixing, and use pyro and silver, followed by a weak iodine solution. This latter gives the negative a nice brown, non-actinic colour, which produces brilliant prints.

A salient point to be observed in all manipulations is the temperature of the various solutions. It should be about 60° all the year round for bath and collodion, but the developer, if the plate has been chilled during an out-door exposure in cold weather, should be gently warmed, in order to bring out detail.

Correspondence.

BALLOON PHOTOGRAPHY.

Sir,—I was very much astonished at seeing in your journal an article, reprinted from the *Philadelphia Photographer*, from my old friend Dr. Vogel, reporting Mr. Warnerke's progress through Berlin, and of which the following is an extract:—"Mr. Warnerke is on his way to Russia, hoping to introduce his invention in St. Petersburgh, for use in the army during the present war. He thinks to make it possible to take instantaneous views of the whole battle-field by means of a balloon, in which the camera is to be raised up to a certain height, from which, by means of electricity, the lens will be uncovered for a moment. We shall learn, perhaps, by his camera, if the soldiers in Plevna have still provisions or not."

Now, as early in last year I patented a method of balloon photography, of which the claim is stated in the following words:—"I claim the combination with a captive balloon of the photographic apparatus, actuated by means of electricity, conveyed as required through wires supported by a rope which retains the balloon to the earth, substantially as described and shown;" and also placed drawings and directions in the hands of Mr. Warnerke to manufacture the apparatus for me, and having at a late interview been assured that my work was progressing—my astonishment will hardly be wondered at.

I perhaps felt a little stronger on the subject, considering that Mr. Warnerke had, to a certain extent, built up his reputation on the roller slide which I invented and described in a paper read at an out-door meeting of the Manchester Society at Bolton Abbey as far back as eleven years ago, many years before Mr. W. was known in this country. After describing the *modus operandi*, I go on to say:—"For stereoscopic work (my pet at the time) a long glass the right width might be prepared, and equal in length to the width of five or six stereoscopic pictures; this, when taken from the glass, to be mounted in a slide specially constructed on the panoramic principle, having two rollers, one at the top and bottom, round one of which the film may be wound, a portion being rolled on to the other after each exposure." I am under a firm impression that in one of our journals, or yearly resumés, I gave drawings almost parallel with the present Warnerke roller slide; but as I have not found this I will presume that I may be mistaken.

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* *St. Louis Practical Photographer.*

As can be seen from many articles I have written, tissue negatives have long been a favourite subject with me, and, *en passant*, I may say that I think the method described at that time, added to our increased knowledge of emulsions, would possess several advantages—notably for enlarging or copying, which cannot be done from a surface possessing an impression from the irregular surface of paper, no matter how highly rolled.

On seeing the article quoted from the Philadelphia journal, I at once wrote to Dr. Vogel, and also to a friend in St. Petersburgh, and while writing the above reprint of the old Manchester paper, I have received a telegram from Mr. Warnerke to say that Dr. Vogel's letter was incorrect, which I trust soon to see verified.

Without intending any personalities, I think the present a good opportunity to reproduce a portion of an article from the same journal as the one that gave rise to this communication:—"Pillaging in photography, we are sorry to say, is no new thing. Sometimes, however, it is the result of ignorance; it cannot then be called pillaging exactly; but there are times when one person will strive to maintain a claim for an invention which he well knows belongs to some one else. Such is the case," &c. The article then goes into personal matters, and concludes as follows:—"It is not a new thing for an adventurous photographer to take up a process of another, and modify it, and then by sharp practice, and sometimes by an advantageous quantity of silver and gold, lay claim to the whole invention. Such conduct should be deprecated wherever met with."—Yours, Walter B. Woodbury.

South Norwood, February 1st.

[We felt satisfied, on reading Dr. Vogel's letter, that some misunderstanding existed, as we felt assured, as all who know Mr. Warnerke will easily understand, that he was incapable of the unworthiness involved in the transaction if the facts were simply as stated. The following letter from Mr. Warnerke explains and sets the matter at rest.—Ed.]

Sir,—When reading the last number of your valuable paper, I observed that Dr. Vogel, in his letter, enclosed a flattering note respecting my visit to Berlin, and announced my proposed visit to Russia. Since that time I have accomplished the announced journey, as well as almost also the object I proposed.

Expressing my sincerest thanks for Dr. Vogel's excellent hospitality and support, I cannot leave unnoticed some misunderstanding respecting the object of my voyage. I described to Dr. Vogel Mr. Woodbury's idea of ærial photography, but never claimed it as mine; and I intended and am successfully introducing in Russia my own system of the sensitive negative tissue.—Yours respectfully,

L. Warnerke.

SPOTS ON DRY PLATES.

Dear Sir,—I observe in the Year-Book that Mr. Mantell complains that, in preparing plates as "Photo-Chemicus" advises, spots appear after two or three plates have been coated. The way to prevent this is, never return any of the emulsion to the pouring bottle after coating the plate; return the surplus solution to another bottle to be subsequently returned to the stock bottle. These plates keep well for six weeks after exposure. The development is as easy as if done a day after.

I have had a turn at most dry processes, and don't hesitate to say, "Photo-Chemicus is the man." The plates are not so quick, but far easier to develop.—Your obedient servant, R. Gordon.

PS.—I see French chalk in cleaning plates is said to obviate the necessity of a substratum for the film. Surely this is rubbish.

REMOVING HYPO FROM PRINTS.

Dear Sir,—For the benefit of the readers of our photographic journal, I am translating Capt. Abney's "Instruction in Photography," and have now advanced to the "Fixing of the Prints." On perusing this book, it struck me whether Messrs. Wratten and Wainwright's method of extracting the soluble salts from bromide of silver gelatine by means of alcohol might not also be efficient when applied to fixed prints partially washed out. Will you kindly start the "happy thought" (?) in the News, or at one of your meetings, where men of talent will discuss or reject it.

The alcohol used might be made serviceable again, by adding burnt lime to it, or by re-distilling, which in large establishments would not entail much trouble.

The stereograms I sent you last year were only washed in one or two changes of water, and then passed through water with a little eau-de-javelle (hypochlorite of soda) added to it. Have they faded?

In Mr. Newton's receipt for matt varnish, Year-Book 1878, the name of the gum, probably sandarac, has been omitted. I always use what Mr. Jabez Hughes communicated a few years ago, which is perfect.—I have the honour to remain, dear sir, your obedient servant,

Amsterdam, 24th January. H. L. T. Haakman.

[Experiment alone can determine the value of the ingenious suggestion. One difficulty which strikes us we may name. In Mr. Wratten's method of removing bromide from gelatine he is dealing with a very permeable substance, whilst paper prints are much less permeable, and hold the hypo with much tenacity. The stereo. prints which Mr. Haakman was good enough to send us last year have not faded at all. The gum referred to was doubtless sandarac.—Ed.]

BUILDING STUDIOS.

Information Wanted.

I am about having a photographic studio built. The space of ground available is about fifty feet long from east to west, and twenty feet wide, bounded on the south by a wall nine feet, and on the north by one six feet in height. At the ends, east and west, there are houses; a tall one at the east, and a low one at the west end.

I think of building it on the ground, not raising it, and intend having it about thirty by thirteen feet. After a good deal of consideration, I have decided to have one huge sash about twenty feet long, with a very steep pitch, and believe it would be all that is necessary. It would slope from about twelve feet or more in the centre, or nearer the south side, to four feet six inches at the eave; no side light. The north side about four feet six inches high, which would be about seven feet from the six-foot wall. I should be glad of your readers' suggestions as to the modification of those proportions.

I may mention that I intend having the panes of glass in the sash about three feet by two feet. Now a sash of these dimensions, to carry such large panes of glass, must be very strong, so I thought of an iron one, as giving the maximum of strength with the minimum of obstruction to light. Should be glad to know where one could be obtained, and the probable cost; there would be nine bars, no cross bars. I want to know the best material to cover the opaque part of roof with; I thought slates. What is the best and cheapest glass? How should the floor be laid? The dark room will be detached. The nine-foot wall will be built in as one side of the studio. Any information would greatly oblige

H. Hamilton.

Talk in the Studio.

Photographic Society of Great Britain.—The anniversary meeting of this Society will be held on Tuesday next, February 12th, at the Gallery, 5, Pall Mall East, when the election of officers and other business will be transacted.

Photography and Art.—*The Art Journal* says:—"Mr. Robert Faulkner, of Baker Street, whose photographs generally, but of children more especially, have long been of unsurpassed excellence, is publishing a series of copies from Nature of the 'little ones,' so exceedingly beautiful and perfect as works of art that high praise of them is a duty. At first sight, indeed after minute inspection, so thoroughly does photography seem to be put aside, that one receives them as transcripts after great painters, and is slow to believe they have no other aid given to them beyond that they obtain from light, regulated by the mind of the photographer, who is as true an artist as any painter can be. He has so carefully studied the pose of each figure in every instance, as to excite surprise at his 'luck' with his little, and usually restless, sitters. In his models he has been fortunate, yet probably he has put away those that did not come well, and selected for his series a few out of many. It is hard to think otherwise, for each print is absolutely perfect. Cheap, or what is called 'common,' they cannot be, for obviously there is much after-study before the work is multiplied. We refer especially to those that are published, but a large number of his productions are what used to be termed 'private plates,' the living pets of a household, who are not to be scanned by every eye. These are far more effective, treated as Mr. Faulkner has treated them, than any drawings can be; all the objections urged against photography vanish; while the likeness is entire truth, it obtains all the value derivable from the most consummate art. His works are by no means exclusively of children; some portraits in his studio of fair or stately dames may be taken for copies from Gainsborough or Sir Joshua. We may not say that the art can never go farther, but beyond question the art has never yet gone so far as Mr. Faulkner has carried it. We should add that some copies are printed in light red, a revival which has been much approved by artists, amateurs, and collectors."

Death from Cyanide.—Dr Hardwicke held an inquiry on Tuesday at St. Pancras Coroner's Court as to the death of Percy Dixon, 39, living at 41, Francis Street, Tottenham Court Road, where he was found dead on Friday evening, with a tumbler and breakfast cup by his side, which contained cyanide of potassium, some of which the deceased appeared to have taken. George Escott Voysey, a friend of the deceased, identified the body, and said that the deceased came from Sunderland five years ago with £500 in his pocket, and embarked in business with a partner as a photographer in the Strand. He soon lost all his money, and after that he became afflicted with melancholia. The witness believed that the pecuniary difficulties of the deceased had driven him to commit suicide. The witness knew that the deceased had carried poison about with him for some time, intending to destroy himself. The deceased, who was the son of Dr. Dixon, of Sunderland, had been of late earning a precarious living as agent for an assurance company. Dr. Whitfield, Goodge Street, divisional surgeon of police, said the cause of death was poisoning by taking cyanide of potassium. The jury returned a verdict of 'Suicide while of unsound mind.'"

Insects Destructive to Photographs.—"Did any one ever notice," asks Mr. T. C. Harris, "the photographic prints in albums, frames, and elsewhere, which were scarred and sometimes ruined by insects? Having lost some valuable proofs in this way, I was induced to watch for the 'varmints,' and, at last, caught one in the act. The damage is done by a little bug or worm, such as is sometimes found on opening an old book. This little marauder is very flat, soft, and tender; of a silver grey color, and about one-fourth of an inch long. In some localities it attacks photographs, and, if unmolested, will soon ruin them. The albumen surface is bitten and scaled, first in the deepest shadows; then the lines and furrows are extended all over the whole print. To prevent the ravages of these moths, the print should be secured to the glass (before framing) by a strip of sticking paper around the edge, so as to leave no place for it to enter. Prints kept loose, in portfolios, albums, &c., should be frequently taken out and aired, the portfolios dusted and thoroughly cleaned. The damaged spots may be touched up with a brush and water-colors, mixed to suit the shade of the part peeled."

New Method for Mapping.—A new method of orography, or mountain representation, whereby the outline of a horizon is given by an automatic operation, has lately been brought to notice by M. Schrader. Considering the horizon as a cylinder, in whose axis the observer is placed, this cylinder is transformed into a circular plane. A telescope attached to a sleeve on a vertical support rising from the middle of a circular disk covered with paper is directed to follow the outlines of the hills, &c., and the movements of a level connected with it are transmitted by means of an arc and a horizontal rack to a pencil or style, which transforms them into out and in movements on the paper. If the telescope describes a circle round the horizon the style gives a corresponding circle on the paper, and if it rises or descends, the trace of the pencil is further from or nearer to the central axis. The telescope being brought to a horizonal position by means of a spirit level, a circle is described round the central axis, and this affords a means of measuring the profiles of the hills. It is easy to transform such orographic circles into a map, and M. Schrader showed the French Academy a geographical map of Mont Perdu, obtained with his instrument.—*Scientific American.*

To Correspondents.

Negative.—The appearance of shining crystalline spots under the varnished film, and the chipping away of the film, point very definitely to the cause of the defect, which is, we fear, quite past remedy. It is doubtless caused by imperfect washing of the negative after fixation. Many photographers who are well aware of the difficulty of perfectly removing hypo from paper prints, never give that subject a thought, after fixing a negative in hypo, and wash much too hastily and too slightly. After fixing with hypo the negative should be very thoroughly washed, and in winter we should prefer to use slightly warmed water. Traces of hypo left behind crystallize in and under the film, and cause brown stains in the negative, which print white, and often cause splitting of the film. You may, if you choose, try the experiment of removing the defect by soaking the negative in alcohol to remove the varnish, and then place the plate in several changes of tepid water to remove the hypo. But there is great risk of your losing the film as it has begun to crack. We do not know of any other remedy.

May.—Immersing the paper in castor oil, or almond oil, will make it transparent, but will, of course, spoil it for any other purpose. Immersing it in turpentine will make it temporarily transparent without eventually injuring it. Perhaps there is no more satisfactory method of making paper permanently transparent than waxing it with white wax, or paraffin. If the paper be well sized, immerse it in boiling water for a time to remove the size; a little soda added to the water facilitates this.

Ignoramus.—There is no very complete or good work of the kind in existence. There is a small one pretty good, so far as it goes, published by Messrs. Low and Co., about 6s. 6d., so far as we remember.

H. L. T. Haakman.—We publish in another column your suggestion. Experiment alone will decide its efficiency. We do not know of any method of preventing collodio-chloride of silver crystallizing when applied to glass, except washing and then re-emulsifying as in washing bromide emulsion. In our own practice we have found that, by using the smallest amount possible of free nitrate of silver, adding citric acid to get vigour, and after coating, drying the plate before a dull fire, we have escaped any troublesome show of spots.

Frank Nairn (New Zealand).—The amount forwarded some months ago paid all due from you up to June. A copy of the Year-Book has been sent. Of "Hearn's Practical Printer" there are none in town at the publishers, all being sold out. It is much to be regretted that some commercial dry plates are so carelessly prepared. We do not know of a remedy. We will ask Mr. Whitehouse if in his coffee plates he has ever noticed tendency in the film to split. We are glad to hear of your success with the process.

White Rock.—The yellow stains are, we have little hesitation in saying, due to imperfect fixation; either from the hypo being not strong enough or exhausted, or the prints sticking together and not getting properly into contact with the solution. Or possibly, and very probably, from excessive cold. When hypo is freshly dissolved, the temperature of the solution falls very low, especially in cold weather, and when the temperature is low it loses much of its solvent power. The red stain is more puzzling, as we have never seen anything like it before. It is probably due in some way to the tint in the paper, the prints probably stuck together.

J. M. R.—The lumpy, uneven character of the film will be difficult to remedy without a change of collodion. It is probably due to the character of the pyroxyline and to the use of a cadmium iodizer. Age will, however, improve it.

Liverpool Amateur Photographic Association.—Report and paper received just as we are proceeding to press. In our next.

Several Correspondents in our next.

The Photographic News, February 15, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Election of Officers at the Photographic Society—The Condensation of Gases—Photographer's Assistants Abroad—The Perfection of M. Vidal's Photochromic Process.

The Election of Officers at the Photographic Society.—The manner of election of the Photographic Society of Great Britain is hardly so well conducted, we think, as was the case with the Photographic Society of London. It may be remembered that the great apple of discord, some three years ago, was the method of nominating members of Council. Hitherto this duty had been done by the Council, individual members having the right of adding other names if they deemed proper; but this old-fashioned plan, which is in action in the case of every learned society and West End club, was deemed obnoxious, and it was swept away, and a new code of laws agreed upon. Under present circumstances the Council have no right to nominate candidates for election, but the duty devolves upon the members themselves. The issue of this state of affairs was to be found on the occasion of the last election. Instead of a list of names being put forward by a responsible body, the election was practically in the hands of two gentlemen, Mr. Pritchard and Mr. Davis. It was these gentlemen's candidates, and none other, from which the Society was bound, by its new laws, to choose its Council, and if Messrs. Pritchard and Davis had only put their heads together they might have saved the Society all the trouble, and made up the Council without going to an election at all. Of course, if the Society is willing that its affairs should be carried on in this way, no one has a right to interfere, only we would warn it that at some future time, perhaps, it may be left without any officers at all. If the two gentlemen whom we have named had been as apathetic as the rest, there could have been no election at all, for, by existing laws, there is no power to re-elect the retiring members of Council unless they have been distinctly nominated. Nothing could have helped in the matter but to have called a general meeting after giving a month's notice, and thus bringing into play the cumbrous machinery of the whole Society. Whatever may have been the shortcomings of the laws of the Photographic Society of London, they were certainly not so absurd and imperfect as those which govern the present Society.

The Condensation of Gases.—One word more has to be said upon the subject of the condensation of gases that has been so successfully performed by M. Pictet, of Geneva, and M. Cailletet, of the Paris Academy. The latter has just published a memoir on the subject in the *Comptes Rendus*, and tells us the means he adopted in liquefying nitrogen and hydrogen. Berthelot, in giving his testimony to the accuracy of M. Cailletet's results, goes still farther than that gentlemen, and avers that during the experiments he actually saw the gases in three different phases: as compressed elastic fluid, as a liquid in a fine state of division, and in the form of spray. M. Pictet seems to have found oxygen less stubborn of treatment than either of its sisters under M. Cailletet's hands, and talks of liquid oxygen dropping from the orifice of a tube. Trials have been made to go still further, and, as in the case of carbonic acid, to secure the gases in the form of a solid—so far, however, without success. Such a result, at best, would be of minor importance; the elements have now been shown to exist not only as gases, in which form they have been known so many years; and that they may well occur in a solid form, if known as liquids, is a circumstance which no one will refuse to admit.

Photographers' Assistants Abroad.—Quite a new era seems to have begun in Germany in respect to photographic journalism, where weekly papers, as well as fortnightly and monthly, are now to be found energetically pushing their way. The *Wochenblatt* has lately taken under its wing what is termed a *Commissions Journal*, for the better making known among principals and assistants any wants these may have. From this *Commissions Journal* we can gather the salaries paid to assistants in various parts of Germany, and these appear to range from 80 to 150 marks per month, or, in English money, from £4 to £7 10s. We must remember that money means far more in the Fatherland than it does with us, and that more can be done in some German towns with £6 a month than would be the case in England with £10 or £12 a month. In Berlin, it is true, some things are very dear, but even there living is much cheaper than with us. For all that, however, assistants seem to secure but a poor rate of pay. A thorough printer offers himself for 80 marks, and states that he is conversant with book-binding. A perfect operator and retoucher rates his services no higher than 120 marks, or £6 per month; but he bargains to remain in Berlin. A thorough assistant, well skilled in all kinds of photographic work, offers to go anywhere for 24 marks, or shillings, a week. An experienced printer, with no other qualification, however, demands 90 marks per month; and two other assistants, both skilled in negative and positive retouching, want 150 marks. In some cases, where board and lodging are found, 75 marks is the salary offered for a competent assistant, and this not in Berlin or any of the larger towns. Principals advertising for printers, operators, and retouchers offer terms quite as liberal as those asked for, so we may infer from this that the sums quoted are under rather than over what is usually paid. The Germans, as we know, excel in retouching, and it will be seen that those who can perform this work receive as high, if not higher, salaries than adepts at the camera. In some of the Paris *ateliers*—and we have no doubt in those of Berlin and Vienna also—assistants are to be found who draw several hundreds a year, one gentleman to whom the princial introduced us, whose studio was situated on the Boulevards, receiving, we were assured, not less than £700 per annum. He happened to be a clever artist as well as a very fine manipulator of negatives, and it was, in fact, due to him that the cabinet pictures for which the firm had established a reputation owed their fine and delicate touches. In fact, talent and skill have their price in photography as in other matters, and those who have these can command high salaries.

The Perfection of M. Vidal's Photochromic Process.—When M. Vidal brought forward his photochrome pictures, the ingenuity of their production was discussed on all hands. Some ill-natured people said they had seen examples of the kind years and years ago—the Woodbury film placed over a coloured litho ground. But M. Vidal's photochromic process was quite distinct from that. First of all he employed some such process as Ducos du Hauron's, securing a series of negatives produced by red, blue, and yellow rays, and then printing from these in colours so as to give an impression in which pigments of various shades and tints were represented. But he did not rest here—he went on improving his wonderful process. He called the carbon process to his aid, and did all sorts of *tours de force* with it. So promising were his results that spacious workshops at the office of the *Moniteur Universal* were secured, and he delivered himself to further experiment. The process made rapid strides. He found it better, however, instead of securing the colours by sun printing, to lithograph them, and to cover these roughly-tinted sketches with a carbon impression in monotone. Within the past few weeks, however, he has achieved perfection. A roughly-coloured basis is produced by lithography, and then this is covered by an image produced by the Woodbury process. Thus the photochromic process has taken a long time to develop, whilst its originality is scarcely so apparent at the end as it was at the beginning.

ON CERAMIC ENAMELS.

BY NELSON K. CHERRILL.

No. III.

The enamel glaze is bought, as prepared for photographic work, from Worcester, where it is made in large quantities. About a thimbleful of the glaze (which is a fine powder like flour) is placed in a small narrow bottle—say, a two ounce medicine bottle—and the bottle filled up about three parts with alcohol. This is marked "Glaze in alcohol." To make up the glazing mixture take a two-ounce medicine bottle, and put in it half-an-ounce of uniodised collodion, such as would be used for negatives; add to this a quarter of an ounce of methylated ether, and half-an-ounce of alcohol; now add as much water as it will take without throwing the guncotton down; to do this set the tap to drip very slowly, and get one drop into the bottle; shake violently, and then get another drop in, and repeat the shaking; so go on till six or eight drops are added, which will be about enough. Shake up the bottle of "Glaze in alcohol," and let it rest about two minutes for the coarser particles to subside, then carefully add some of the upper part of the mixture to the diluted collodion—enough to make it rather opaque and milky-looking will do. This is the glaze ready for use; it must be well shaken up each time it is used.

When the enamel is quite cold, balance it on the top of one finger if small, or near the edge of a piece of flat wood if large, and pour the glaze mixture over it; then immediately tilt the enamel up to the vertical position, letting the glaze run off on to soft blotting-paper, rocking the tablet in the meantime to prevent the formation of lines. When the collodion is set, place the tablet in a muffle on a piece of fire-clay, and gradually introduce it to the full heat; keep a careful watch now to see that the burning does not proceed too far. The glaze should only just melt; as soon as this is the case, which will be seen by looking at the reflection of the bent wire held just above the tablet, pull the enamel out, and when a little cool remove to a block of wood to get cold again.

The image is now indelibly fixed, and it may be treated roughly with impunity. The picture is not, however, at its full beauty as yet, as, if all the baths, &c., have been in good order, one glazing will not be sufficient. The whites will be glazed, or have a polished appearance, but the darks will be still of a matt surface, and not transparent in effect, as they should be. This is overcome by repeated glazings. No enamel is perfect that has not been glazed at least five times. The number of separate burnings (say, five or six), as here recommended, give a totally different effect to what would be obtained by one great burn with the glaze applied thicker. Those who wish to save themselves trouble will work in this way; but any one who wants to get the best results will not mind the trouble of five or six, or even a dozen glazes.

When the glazing comes nearly to an end, there will be found some little points where improvement is needed in the way of retouching. This point is very easily gained: collect all the trimmings of films, after they have been through the toning and ammonia baths, and all waste or torn films as well; place them a few moments in the muffle on a piece of fireclay—they will instantly burn, and the ash is to be carefully collected and kept in a small bottle. A little of this may be put out on a palette, with a minute atom of the glaze powder, and one drop of some essential oil, and then well rubbed down with a muller. The paint so obtained may be used with fine brushes, dipped in turpentine, and, the work being burnt in to the enamel, will take the same colour and surface as the rest of the picture.

Ceramic colours may be applied to enamels, and burnt-in with considerable success; but I have found much difficulty hitherto in getting the red shades wanted about the lips and cheeks right. I have used the colours made by Lacroix, of Paris.

When an enamel has failed it may be put on one side, and when there is a sufficient collection of them the images may be dissolved off with fluoric acid, applied with a rag at the end of a stick; and then, after washing, the tablet may be fired in the muffle till it melts to a good bright surface. If this be carefully done, the tablet so renewed will be as good as a new one. In this firing after cleaning the image will often appear again when in the heat. If this be the case, the heat should be continued till a full glaze has been obtained, when the tablet, after cooling, may be again treated with the acid, and again fired.

When the successful enamel is finished up to the last heating, the name and address of the artist, and other matter, may be written on the back, with a fine brush dipped in the same paint as used for retouching, but a little more thinned with turpentine. As, however, the enamel is to last for thousands of years—or, at any rate, hundreds—and, as the name and position of the person photographed will, probably, be of more interest in a hundred years' time than the knowledge of the name and address of the photographer who produced the work, I generally print on the back, in small lettering, the name and other particulars of the person whose portrait is represented on the obverse. This remark, however, applies more to persons of great social distinction than to ordinary people.

I have now gone over the whole process of making ceramic enamels as I am now doing them, with, in my own practice, unvarying success. I have, as I said at the beginning, tried thousands of experiments, to find out material improvements in the process, but each line in which I have attempted deviation from the process given above has ended in such deterioration of the work as to lead to its abandonment. If the failures I have encountered, and found out the cause of, were detailed in full, they would fill the News for a month.

I will, however, condense into a paragraph the main causes of failure, which should, however, never be met with by any one who will follow my instructions accurately.

Failures in enamels are of four distinct classes, which may be thus enumerated;—Class I. Failures in development. Class II. Failures in the direction of getting poor slaty bluish colours, which glaze all at once when put in the muffle. Class III. Failures in the direction of excessive blackness just the opposite to the last. And—Class IV. Failures in the glazing operation itself.

With regard to the first class of failure, I would suggest that it is imperative that the development proceed slowly—this seems to me the only condition of success. The photographer's knowledge of his business will enable him so to manage the light, lens, exposure, &c., of the film as to secure this necessary condition. I do not think the developer I have given is by any means the only one that will do, though, as in my hands it succeeds the best, I never use any other.

The second class of failures arises from there being too much gold in the toning bath, or rather, perhaps, too much in proportion.

The third class arises from there being too much iridium, or too much in proportion. Both these may be avoided by a strict adherence to the formula I have given.

The fourth class of failure, the only one to be really feared, is the most difficult to deal with. It is much more difficult to describe than to show. I might say, as did Artemus Ward, "If any of your readers will come to me in New Zealand," I will give them every information. The chief thing to avoid in glazing is the getting an unequal layer of glaze on the tablet *the first time. Until the first glaze is burnt in, the picture will rub very easily*, therefore a badly laid glaze will be its ruin, as it cannot be removed. After the first glaze is burnt the enamel is safe, and any further error in the matter of pouring on the glaze, &c., can be rectified by simply washing it off again under the tap. Then, again, there is a possibility that when too much glaze is used the enamel will spoil by what I have, till recently, looked at as "burning out," but which I have since found out to be simply a sinking in of the image. The best remedies for all errors in glazing are to use plenty of alcohol in the collodion, and plenty of water; and at the same time, the smallest workable quantity of glaze, making more burns of it, but doing less work at each burn.

In concluding this paper, I wish distinctly to disclaim having made any invention or discovery connected with the enamel process. I obtained my information in the first instance, as stated, from Mr. Watson, of Hull, and his process has been the substantial basis of all I have done with enamels.

FOREIGN NOTES.

How to Increase the Sensitiveness of Bitumen of Judea—Richter's Toning Solution—Braun's Sensitizing Bath for Tissue—The Film Competition in Paris—"La Lumiere"—Salicylic Acid in Developers.

Herr Husnik, finding that bitumen of Judea is too slowly impressed by light, has sought to increase its sensitiveness by the admixture of various substances, so that the bitumen might be made use of in heliographic printing. The *Monatsblatter* mentions the method he employs, which consists in mixing with the bitumen some alkaline bichromate. To accomplish the matter perfectly, however, he requires a solvent which will at once dissolve the resin and the bichromate.

Solutions of borax, the caustic alkalies and their carbonates, soaps, and liquid ammonia, which dissolve the resin, have all answered in some degree to effect their purpose, but of all, he specially recommends liquid ammonia. He dissolves ordinary resin, shellac, gum dammar, or any other resin, adds to them a little alcohol, and to this solution, containing from three to four per cent. of resin, he adds some bichromate of ammonia, and thus obtains a mixture which, poured upon a metal plate, dried, and printed, yields a film in which the parts which have been subjected to the action of light are completely insoluble in such liquids as usually dissolve the resins, such as caustic alkalies, alcohol, essence of turpentine, benzole, &c. Those parts of the film which have not been acted upon by light remain, on the other hand, perfectly soluble in the alkalies and essences.

A toning bath is warmly recommended by Herr E. Richter, of Munich, for the treatment of albumenized prints, namely :—

A.—Chloride of gold ...	1 gramme
Water	1,000 grammes
B.—Acetate of soda ...	15 „
Water	500 „

Solution A is poured into solution B, and there is then added four drops of a saturated solution of sulphate of copper. The mixture is then allowed to rest for some days. The toning is allowed to proceed until the half-tones have assumed a light blue tone. Although, apparently, rather red at this moment, it will be found in the end that the pictures have been perfectly toned, and that the whites are very pure indeed. The bath must not be employed in too concentrated a form—say of ten per cent. strength.

M. A. Braun, of Dornach, recommends, for vigorous negatives in carbon printing, a sensitizing bath thus made up :—

Monochromate of potash	2½ parts
Bichromate of potash	2½ „
Water	75 „
Alcohol	20 „

The salts are dissolved in water, and then the alcohol is added; the latter helps the tissue to dry. M. Braun also recommends the re-crystallizing of chromium salts to free them from alum and acid.

The competition under the auspices of the French Photographic Society, for the best pellicle—thin, flexible, and capable of replacing glass for the support of the sensitive film—has been postponed for a while. Only one competitor, it is said, has offered himself. Where is Mr. Warnerke, we should like to know?

The last number of the *Bulletin Francais* contains a well-written article on Fox Talbot, showing that he was distinguished not only as one of the fathers of photography, but that he was almost equally renowned as a great antiquarian.

A new journal, to be called by an old title, *La Lumiere*, has just been started by the Dornach firm, and is edited by M. Braun, and will contain illustrations. It is published every month, and the first number contains a picture of the Venus of Milo, printed by the Woodbury process. It was projected by the late head of the firm, who scarcely lived to see its issue.

At the January meeting of the French Photographic Society a discussion upon the salicylic acid developer took place. According to the views expressed, the members do not appear favourably inclined towards the use of the acid in this connection, where its rôle is said to be that of an accelerator.

EDUCATIONAL USES OF PHOTOGRAPHY.

BY EDWIN COCKING.*

Mr. Pearsall's paper on "Educational Aid by Photographic Exhibits" was so full of suggestive matters that it would be difficult for one person to study all the points touched upon so as to make observations upon the same.

I therefore propose to say a few words respecting the usefulness of photography in one or two educational points of view, and more especially in respect to its aid to the art-student in drawing; and I speak practically upon this part of the subject, having studied as an artist in the Royal Academy, and also from having taught drawing in schools in earlier days. Now, it must never be forgotten that the intention of drawing by hand is not only the correct representation of the object, but also to cultivate an individuality in the style or manner of producing such representation.

In learning to draw, the young student has first to perceive the difference between lines opposing each other, and afterwards those closely approximating, and to practise the hand in its endeavour to imitate such differences; hence the first models or outlines must not only be very distinct, but the differences between two or more lines must be strongly marked.

With regard to the correct representation of any object, of course, all artists must admit that no drawing by hand can equal the absolute imitation which photography gives, both in contour and shading of surfaces, and it is just because these outlines are so exquisitely beautiful in the softness—or, rather, total absence—of outline and submergence of one part into another, that photographic representations are very difficult to the young student in drawing to copy or imitate.

It will, then, I think, be evident that the necessity plainly arises for some skilful and cultivated hand to prepare the early studies, as he can firmly define all outline, and the student is not perplexed, but sees at a glance what he has to do; or, rather, as drawing is, after all, nothing but the outcome of memory, which the hand is taught to obey and reproduce, so the forms which impinge upon the mind through the eyes should be well defined, and thus simplify the work which the hand is educated to perform.

The same remarks apply to shading, as it would be utterly impossible to imitate the continuous deepening of tone which nature reveals through the agency of photography. It also, in this case, becomes necessary to form or invent a manner or style of producing an imitative result by some distinctly-defined shading, which either is individual or general. Hence I arrive at the conclusion that photographs of natural objects are not the right things to place before a beginner in drawing. But as soon as the power to represent visible objects by what are really *artificial* signs has been attained, then photography would be useful as standing in the place of the originals.

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* Read before the South London Photographic Society.

But it is quite another thing to recommend the multiplication of a good drawing copy by means of photography. In this case every variation in touch—even the gradual wearing away of the pencil or crayon—becomes evident, and the expression, or what is called the "feeling," of the artist can be seen, as also the possible repetition of lines, by which he arrived at his final outline. In this way photography can do splendid service as an educational aid. I cannot but think that there is a future for photography in supplying such an evident want. The difficulty to be overcome will be in producing at a commercial price the number of copies. However, in view of the immense strides which mechanical printing through the agency of photography has recently taken, the means may very soon exist by which artistically-arranged and technically-adapted natural existing objects may be multiplied and brought out as useful and necessary aids to educational study.

Mr. Pearsall says:—"Lithographic copies are given to be copied with the lead pencil." I quite agree with him that this is wrong, and equally errs, although on the opposite side, with photographing from objects, because, the mode of production being different, how can the initiative results be equal?

Again: it is stated—"That photography would aid in correctly training the faculties of observation." Here every one who gives a thought to the matter will agree with such statement, more especially in botanical studies, where photography renders the minutest form and development of parts with such marvellous fidelity. But here comes in the point of view I have taken with respect to drawing. All these photographs should be produced under certain conditions of representation which would show them as distinct and separate from surrounding objects, so that the individuality of the object should be taken in at a glance.

As an aid to botanical studies, where stems, leaves, blossoms, and flowers can be so beautifully shown, we have had strong evidence of the capabilities of photography in the many really exquisite examples recently seen at the photographic exhibition, but which, for the purpose of being useful for educational purposes, would require to be treated both from their own perfectly natural positions, and also from some more conventional way of representation, for the purpose of classification and distinctness of form.

Then, take photographs of surgical cases as an educational aid to the medical student. Here difficulties arise in the matter of colour, which becomes so great a help in the diagnosis of disease. I recollect, many years since, when, as a young artist, being engaged to attend at the Ophthalmic Hospital to make drawings of diseased eyes, I was much surprised to have eyes put before me which to all appearance were perfectly correct, but which, upon closer inspection, proved to have some very small irregularity in the colour of the pupil. This necessitated much care and skill to make evident on paper. Here photography would have been comparatively useless; but, where conformation or abnormal form is all that is required, photography must be invaluable, as all the parts being taken at the same time their relative size and position become correctly represented.

Photography, then, I consider, becomes applicable as an educational aid, and especially in its relation to drawing, when facts have to be recorded, and the *objective* side of knowledge is in operation; and it is because those photographic facts are so purely objective that therein lies their great power and usefulness. But the very moment that the *subjective* side of knowledge is cultivated—where expression and the consequent development of individuality becomes a necessity—then photographic records must give way to those produced by the human hand, which, being guided by the mind, becomes imbued with a vital meaning; in other words, give evidence of the wide gulf which must ever separate matter from mind.

At the same time there remains much good and true work which photography can do, and the only thing at the moment to be brought about by such discussions as these is to define the proper and legitimate road along which our art-science, by steadily pursuing its way, will ultimately arrive at a position where its utility will be recognised, and its work accepted as helping forward the progress of education.

A FURTHER IMPROVEMENT IN THE GELATINE PROCESS.

BY REV. H. J. PALMER, M.A.*

The subject which I propose to bring before you this evening is one, I think, of considerable importance to photographers in the field. The advantage of superseding glass as a vehicle for the sensitive film in favour of something more portable and less frangible cannot be gainsaid. I have already worked out a process whereby the ordinary sheets of gelatine, to be purchased in the shops, may be made available for this purpose; but, in spite of all the simplification I have been able to effect in the *modus operandi*, the end in view cannot be obtained with the perfection to be desired.

In the first place, the gelatine sheets of commerce are usually full of bubbles and specks; and, in the next place, to obtain complete contact between the gelatine and the surface of its temporary support is a process which, in spite of my own testimony in its favour, I must confess to be, at times, no easy matter. During my recent vacation I set myself to work to discover the ingredient employed by the gelatine makers to enable them to separate the dried sheets from the glass slabs upon which they have been poured. This ingredient had made its presence manifest to me in my previous experiments, both by its colour, its taste, and its smell; and I felt that if I could discover its character further, it might then be in the power of gelatine workers to make their own sheets for photographic purposes, or even to incorporate this ingredient with a gelatine emulsion, and thus obtain a film which, when dry, might be stripped from its support and form a self-supporting sensitive sheet. My appeals to gelatine makers were of no avail, for I was seeking to unravel one of the mysteries of the Eleusis of trade; books were entirely silent on the subject; and I was, therefore, left to my own resources in the matter.

I will not inflict upon you the wearisome details of my experiments in this direction; suffice it to say that an accidental carelessness in dealing with an emulsion prepared with gelatine containing the substance of my quest gave me the clue, and I found in ox-gall the material I was in search of. I cannot claim to place before you a perfected process, for my leisure time has come to its close while yet the application of the discovery remains in an inchoate condition. Sufficient success, however, has been attained to warrant me in trespassing upon your patience to-night, in the hope that other workers may be able to carry the matter to completion.

Ox-gall may be obtained in three forms:—There is, first, the ox-gall proper; then a purified, pasty preparation of it used in medicine, and sold by chemists; and, lastly, a clear, colourless liquid supplied in the shops for the use of artists. I have found that all three kinds—either when employed in the gelatine itself, or when used upon glass as a substratum—will effect the desired end, provided that plain gelatine be used; but I have hitherto failed in every effort to employ it thus with an emulsion. The sheets I have here were stripped from glass which had been immersed in ox-gall from the butcher's, and then dried. They proved to be readily removable; but until a harmless and complete deodoriser has been found I cannot recommend the experiment to any one who is not possessed of a strong stomach and very unsusceptible olfactory nerves.

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* Read before the Liverpool Amateur Photographic Association.

Here are some plates with a dried, plain film of gelatine still adhering to them. In this case the ox-gall is present in the film, and I think I can show you successfully how readily the sheets leave their support when the point of a knife has been passed round their edges.

My next specimens consist of sheets similar to those I have just stripped from the glass, with the addition of a sensitive coating of emulsion. These, also, I will remove from the plate and pass round for inspection. I have exposed and developed one of them this morning, which I must show you still in its wet state. The negative is a good one, but, being the first I have exposed prepared by this new process, it has suffered to some extent from the frequent handling and examination it has undergone.

These films were prepared as follows:—Plain gelatine, containing a proportion of ox-gall, was poured upon clean glass, and then, when dry, was sensitized with a film of ordinary emulsion. The advantage of this plan over that to which I have alluded above, is considerable. The emulsion will be found to flow easily over the gelatine, and when desiccation is complete the sensitized sheet will easily come away from the glass.

I have not found the second kind of preparation of gall which I have mentioned nearly as effective as the noisome article which the butchers supply; and the prepared alcoholic solution of the artists' colourman is too expensive to be employed largely in the process. But I think that if gelatine workers would only create a demand, the manufacturers will supply us with gelatine prepared with ox-gall for this special purpose. It will then be merely necessary to dissolve the required quantity in water, to coat the glass plates with it, and finally, to sensitize with the emulsion in the usual way.

The one drawback to the preparation of these films lies in the slowness of the drying process. Some one has recommended dipping the gelatine in alcohol. I tried this recently, but found the alcoholised sheets were quite as slow as the others.

To those who would wish to experimentalise for themselves, the following directions will be useful:—Take of fresh ox-gall one ounce, add it to eight ounces of water, soak in this one ounce of common gelatine, apply gentle heat, and filter. Coat the warm plate in the usual way with a thin film, and place it upon a level glass slab. Now pour from the lip of the cup upon the levelled plate about a drachm more of the liquid gelatine, and leave till set, when it may be stored away in the drying cupboard till it is thoroughly dry.

The same process must be repeated with the emulsion, *i.e.*, a supply should be flowed like collodion over the whole surface of a warmed gelatinised plate; the glass must then be placed upon the level slab, and a small quantity of emulsion added. The tip of a glass rod or a clean finger should now be applied to direct the emulsion to each corner and up to the edges of the plate, and it may then be allowed to set and dry in the usual way. The film will come away from the glass by inserting the point of a knife round the edges, and it may be exposed in the camera in front of a thin piece of glass to keep it taut in its place; or, better still, the sheets may be arranged after the fashion of a sketching block, with a piece of non-actinic paper separating each sheet from the rest, and the whole backed up with a plate of tin or zinc. To develop the sheet: wet it thoroughly, place it in a shallow dish, and apply the usual alkaline developer. Should the negative assume a reddish tinge when fixed, washed, and dried, printing should be accomplished through a piece of blue violet gelatine. I must not omit to mention that the negative should, when the washing is completed, be placed upon a glass plate, and left to dry spontaneously.

Throughout the process care must be taken not to raise the temperature of the room or closet in which the drying is effected above 60°, otherwise inevitable cockling an splitting of the film will result. The former evil may, however, be remedied by leaving the cockled sheets in a damp place for a time. They will then become perfectly supple, without tackiness of surface, and may be flattened by placing them under a moderate weight.

In conclusion: I may remark that Mr. J. Green, of Dalston, London, is the maker from whom I purchased the sheets I have hitherto employed, and I am not without hope that he and other manufacturers may be induced to prepare for workers in this process a transfer gelatine which could be used as I have suggested above. Possibly also Mr. Kennett or Mr. Mawdsley may be persuaded to try their hands at the production of these portable sensitive gelatines, and supply them to the photographic world for the use of tourists on their travels.

THE ART OF PHOTOGRAPHY.

[In a notice of one of Captain Abney's photographic works the *Echo* makes the following general observations on the above subject.]

The art of photography has perhaps as many amateurs as professionals in the ranks of its students, especially if we exclude the mere portrait-takers from the list, and it would be difficult to prove that the professionals surpass the amateurs in the practice of the art. Having appreciated that fact, it is easy to understand why there are so many guides and hand-books for the benefit of operators, and how it is that so extensive a business has sprung up in connection with their operations. Photography is an art that is readily learned by the least skilful; the veriest tyro can, with ordinary care, produce a picture, of a sort, and that fact has probably encouraged many to persevere until they became adepts with the camera. Like most other arts, the best work is produced only by the most skilful artists, and such photographs as we see nowadays are the outcome of much painstaking study, and no little experience in the handling of chemicals and lenses, together with unlimited perseverance in the use of developers and intensifiers. The distinguished chemist Scheele was the first to discover that horn silver was acted upon by light, and although he was led to investigate the phenomenon, he little dreamt of the vast results that would, in less than a hundred years, follow his discovery. In fact, the discovery of Scheele appears to have attracted little attention, for it was not until 1801 that we find any further notice of the facts; but in that year Ritter, of Jena, announced that the chloride of silver darkened rapidly in those rays of the spectrum lying beyond the extreme violet. In 1802, however, Wedgwood read his classical paper before the Royal Institution, and attention was at once attracted to the new method of copying paintings by the action of light upon nitrate of silver—and photography was born. In 1814 Nicéphore de Niépce discovered that bitumen became insoluble after exposure to light, and in 1827, in conjunction with Daguerre, he laid the foundations of modern photography. Whilst Daguerre and the younger Niépce were developing the art, Fox-Talbot was pursuing a line of investigation which resulted in the discovery of the fact that paper soaked in a solution of common salt, and subsequently coated with a solution of nitrate of silver, became sensitive to light. Photographs of lace, ferns, and similar articles were obtained by this means, and the art progressed steadily until Niépce de St. Victor laid the foundations of modern photography by producing pictures on glass, while Fox-Talbot perfected the method of securing them upon paper. To Scott Archer and Dr. Diamond belongs the merit of introducing the collodion process which is the basis of the greater portion of the photographic work of to-day, and from that time (1851) the progress of the art has been steady, the names of those who have assisted to develop it being too numerous to mention here.

The Photographic News.

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THE PHOTOGRAPHIC SOCIETY.

"What is the especial purpose, or *raison d'etre*, of the Photographic Society of Great Britain, and what actual end does it serve?" These questions are asked by a correspondent whose letter we print on another page. That such a society does subserve several important ends may be quite certain, without the fact being easily, or, in a few words, demonstrable. Dealing with the general subject, we may remark that the value of associations in which men of common tastes and common interests meet to discuss the various phases of the subject which concerns them, and to take united action for its interest where necessary, seems to be universally acknowledged. Almost every science and every art has its special society, institution, or association affording facility of various kinds for discussing its various phases, and taking steps for securing the interests of its confederated devotees. That a new art like photography, combining in itself so many phases of interest, scientific and artistic, needing and admitting of so much discussion, and involving so much confederated action, should have its societies for conferring upon its various phases seems to be simply a matter of course. And that a central metropolitan society possessing a representative character should exist seems to be equally a matter of course. Early in the history of the art the necessity for such a society was recognized, and good men and true, the *elite* of the numerous band who had already become enthusiasts in the science of the sunbeam, came forward and formed the Society. The President of the Royal Academy was its first president, distinguished men of science sat in its council, and every class of society, including royalty, was found amongst its active members. One of the first, most important, and beneficial steps it took was the establishment of a journal: and the Photographic Journal became, and continued for many years, one of the most interesting and beneficial aids to the art which could possibly have been created. The establishment of a journal to aid the new art, which would have been hesitatingly attempted at first by private enterprize, was regarded by the new Society as a necessary and legitimate part of their operations, and it became a lucrative source of income. With the growth of the art, competitive journals have been established by private enterprize, largely superseding the journal which first showed the way. It exists still, as the necessary and official organ of the Society, and old members of the Society, who, for old associations sake, would be sorry to see it given up, are rejoiced to see it take a new lease of interest and life under the care of Captain Abney. This, then, the Society did: it founded a valuable journal, which was the parent of the various photographic journals which exist, and are regarded by common consent as—some of them—almost necessary to the art. Another important step of the most vital importance to the progress of the art was the establishment and maintenance to this day of exhibitions of photographs, which are of the highest interest and the utmost value to every one in the slightest degree interested in photography and its developments. Of the long list of valuable papers read and discussed at its meetings, it is not necessary to speak. Nor is it necessary to dwell upon the pleasant opportunity which its meetings afford for gentlemen interested in the same things to meet face to face, and confer upon points of interest, for these meetings, when not protracted in their organized character, become pleasant conversazione. The Society has conducted some important enquiries, with more or less success. The report of the committee appointed to enquire into the causes of fading was very interesting, if it did not much aid in removing the causes of fading. The collodion committee was well-meant, although a failure as a matter of fact. The attempt to establish a central home for the Society, with a library, &c., always accessible to members, was also well-meant, if not successful.

Unfortunately, photography outgrew the early glamour which surrounded it, the Society ceased to be so fashionable as it had been, and many members fell away, and finally a series of losses of different kinds brought it into difficulties, so that its power for active usefulness (even supposing plans had been devised) became crippled. A special effort was made, and the financial difficulties were overcome, when the unfortunate disruption of a few years ago came. Under the plea of requiring extended voting facilities for the nomination and election of officers, the Society was convulsed. When the new machinery for universal voting was put in action, the Society placed in office, almost without exception, the same council which had been in office before. A few years have elapsed, and two members of the Society alone care to nominate candidates for office. Such is the strange irony of facts!

Happily, however, the Society has outgrown—or is outgrowing—the injury caused by the disruption; a spirit of co-operation and geniality prevails, and it is ready for any good work which legitimately falls within its province. Such a step as that to which we referred in our last, the possible founding of educational facilities in connection with the Society, seems to be not beyond its province, but beyond its means. The number of members is not large, and the work at present undertaken by the Society fully absorbs the funds it receives. The ordinary machinery of the Society, the issue of its journal, and the maintenance of the exhibitions, fully absorb the annual income of little more than £200. With an income of five times that amount, grand possibilities would be open to such a society. We can see no reason why a representative Photographic Society of Great Britain should not number a thousand members, at least. It should be an honour and privilege to belong to such a society, eagerly sought after; and we have a profound conviction that, under some conditions, such a state of things might exist. We feel satisfied that if educational facilities could be associated with the Society, examinations made, and certificates, if not diplomas, granted, such arrangements would add enormously to the prestige and success of the Society. To initiate such a system, the expenditure of money would be necessary; although the scheme might, and probably would, become self-supporting. But it is clear that the Society must be in possession of funds on a much more ample scale than it is at present, before any step could be taken. The first step, therefore, towards the attainment of such a possibility is the increase of the members of the Society. There may be many who will say: "We would readily join the Society in view of such a consummation; but who is to guarantee that it will come about?" To this we can simply reply that a representative society is practically governed by the wishes of its members; that any project supported by the desires of a large number of its members would be certain to be eventually carried out by the council or governing body. Those photographers, therefore, who desire earnestly the advancement of the art, and the elevation of the status of photographers, and who believe that in culture, and the authoritative certification of that culture, these ends are to be secured, will assuredly facilitate such a consummation by joining the Photographic Society, and inducing all who may agree in their views to join also. When the members and funds are sufficient, there is nothing, within reason, that they may not achieve.

ON THE KEEPING QUALITIES OF BROMIDE OF SILVER EMULSION.

M. Davanne, the President of the Commission nominated to enquire into the keeping qualities of bromide of emulsion, has just reported on the condition of certain samples which have been returned to him after long sea voyages. The samples were prepared according to the formulæ of M. Chardon.

The tests were very severe, since they included a voyage out and home from China. The plates do not seem to have stood very well, nor the wet emulsion, but the dry material had not been affected.

M. Davanne reports that the dissolved emulsion was intact when it returned, but the solution was impoverished and more fluid. Some plates prepared with the product gave only passable results. The emulsion seems at its best two or three days after preparation—before that period it is apt to clot; on the other hand, after standing some weeks, the separation of the elements becomes marked, and the results are less and less satisfactory.

The dry emulsion, which was for three months in well-stoppered glass bottles, was in the same condition as when it left; in every respect it was as good as when freshly prepared, so that it may confidently be said to be capable of withstanding sea voyages and a temperature up to 40° Centigrade.

In the case of dry emulsion enclosed only in cardboard boxes it was different. The results obtained with this product were unfavourable, the images one and all fogging. Some of the prepared plates turned out good, and others bad; consequently the packing more than anything else was doubtless at fault. On this score nothing very definite could be said.

The summary of the Commission is as follows:—

Pure bromide of silver emulsion, placed dry in carefully-stoppered bottles, will support a long sea voyage and a tropical temperature. The same compound is, however, not equally preserved when, instead of glass bottles, a cardboard package is employed.

The emulsion in form of a liquid does not sufficiently resist the effects of a three months' delay to be employed afterwards with advantage.

The plates prepared appeared to have kept in good condition, notwithstanding the elevated temperature to which they were exposed; but the general conditions under which they were preserved were so uncertain that, until further experiments are made, nothing very certain can be said on the subject. It seems best to carry the dry emulsion separately, and also the glass plates solvents, so as to produce sensitive plates at any moment. The manipulations necessary are very simple, and in this way complete security is exercised.

The Commission demands further time for the prosecution of its researches, and requests authority for the name of M. Andra to be added to the list of its members.

Thanks to the captains of the mercantile marine who gave their assistance were voted.

PHOTOGRAPHY IN GERMANY.

BY ERNEST DUBY.

Mr. Th. Honikel's Improvement in Carbon Printing.

You will certainly agree with me that the improvement I am going to write on is likely to produce the greatest revolution in carbon printing, and be glad to know that the News is the first English journal receiving intelligence of it. Let me, therefore, simply describe the matter.

Mr. Th. Honikel, photographer to the Anatomical Institution of Leipsig, a gentleman already favourably known for his beautiful micro-photographic work, and his great great skill in carbon printing, has just now discovered an improvement in this process that merits the attention of the photographic world. He did not like to see that with the carbon process the greater part of the details is in the shadows and half-tones of the picture, the gelatine in the lights being almost entirely washed out. He therefore endeavoured to produce a method by which the gelatine in the lights would be spared, and thought, with reason, that in the shadows, details would not be of so much consequence as in the lights.

His trials have been crowned with success, and the matter is the easiest thing in the world. *Instead of taking carbon and different colours for making the paper, he took white colours, and so produced a* white *carbon paper.* Now, instead of exposing under a *negative*, he must of course expose under a *positive*, and, moreover, develop on *black* paper if he wants pure carbon prints, or on coloured paper if he wants *coloured carbon prints.*

The advantages of this method of Mr. Honikel's are considerable. Firstly, the colour of the picture being *white*, and the latter having been exposed under a *positive*, the parts that form the lights will become *insoluble*, and therefore, the gelatine not being removed, the lights will be full of the finest details. Afterwards the sensitiveness of this white paper is *enormously superior* to that of common carbon paper. Mr. Honikel stated that a picture on this paper will not want more than the twentieth or twenty-fifth part of the time required for a common carbon picture. For this reason it will not be a difficult thing to produce direct enlargements on this paper by means of the camera. You only make a diapositive if you have a negative to enlarge, or you directly enlarge a C.D.V. by means of the camera, and then introduce into the holder a piece of this white gelatine paper.

TO RESTORE AN OLD NEGATIVE BATH.

BY R. TUDOR WILLIAMS.

Having a Winchester of old bath which gave pictures of a dirty and streaky nature, I decided to renovate it, and succeeded in the following manner:—Neutralise and boil in a twelve-ounce evaporating dish of best quality (a larger size would not be so convenient); immediately it reaches the boiling point hold a lighted taper over it, and the vapour from the bath will ignite; then allow the flame to burn out of itself, and the bath may then be considered cured, and so on until the whole has undergone the same operation.

The solution should then be filtered, and if it contains an excess of iodide it had best be done while quite hot; if it does not contain more than is necessary, the whole may be boiled as stated above before filtering. This method I have found answer equally as well as the more troublesome one of boiling to dryness, and it is of still greater importance when other than distilled water has been used, which latter is often difficult to obtain in small country towns. Of course I am aware that to boil an old bath to dryness has long been advised, but in the method I have given above, it is not only the boiling, but the setting fire of the ether and alcohol given off, which causes the results; nor is the burning of the superbundant ether and alcohol, caused by the frequent immersion of the coated plates, the only advantage of the latter part of the process, for it (in my belief) destroys any organic matter which may be present. Be this as it may, I am sure this is far the best way of curing an old bath I know of. Should the bath require strengthening, the silver should be added before commencing the operation, or else a certain amount of water should be allowed to escape as steam. On the other hand, if the bath is of full strength, it will only lose water by evaporation to the extent of about three ounces in a whole Winchester.

As I believe the most frequent cause of a bath getting out of order is due to the accumulation of large quantities of ether and alcohol conveyed to it by the coated plates, I would go so far as to suggest that the method here recommended be adopted whenever the bath smells strongly of the collodion, even if in good working order.

Of course baths so treated will require the addition of a few drops of nitric acid to make them work cleanly.

I hope this idea may be useful to some of my fellow-readers.

COPYING AND ENLARGING.

BY E. EUGENE BROWNELL.*

Have a long box, made in sections, so as to slide into each other, with a front constructed to use tubes of two or three different sizes; a quarter or half-size portrait tube with central stops is preferable. Have your stand constructed with a lever underneath, in such a manner that you can raise or lower the small picture while focusing. Old Daguerreotypes, if tarnished, should be cleaned. This is done by holding the plate by the lower corner (a pair of plyers work finely for this purpose), and wash gently under a stream of clear water, then flow with a weak solution of cyanide freshly prepared. Leave this on the plate a few moments, then wash thoroughly, and dry. Copy in direct sunlight, unless the Daguerreotype is scratched, then use a diffused light.

Old cartes-de-visite should be lubricated and burnished the same as new ones, and copied under a piece of plate glass. This will do away with considerable of that coarse, spotted appearance, caused by the magnified fibres of the paper, which is so very objectionable to the customer.

Ferrotypes should have a new coat of thin varnish. This will not only give brilliancy to the picture, but cover up all of those little scratches in the varnish, and save much of the work on the print.

Tintypes and ferrotypes will require about fifty per cent more exposure than Daguerreotypes. Much time is saved, and often better copies secured, by using a reflected light from a 10 by 12 mirror opposite the direct light.

I wish to say a few words in regard to handling Daguerreotypes. Nine-tenths of all of the scratched or otherwise defaced Daguerreotypes that are brought to us loose in their mountings show evidences of having been tampered with. Many cases of this kind have come to our notice, where we knew that the picture had been copied before, and the photographer had failed to seal the picture and deliver it to his customer in the same safe condition in which he had received it. Now, what is the result of this neglect? In time dust will accumulate on the face of the picture, and the fond wife or mother will, in her anxiety to keep her treasure untarnished, carefully wipe the face of the picture, but instead of removing the foreign substance she will, in her ignorance, nearly ruin the picture by wiping it full of scratches. I think that the photographer who will return old pictures in this shape is a fraud and a cheat, and one not to be trusted under any consideration.

For copies requiring much contrast a thick collodion should be used, with less bromide. We have been using the following formula for collodion, and it has always given satisfactory results :

Alcohol	10	ounces
Ether	10	„
Cotton	120	grammes
Iodide of ammonia	80	„
Iodide of cadmium	40	„
Bromide of cadmium	40	„

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* *St. Louis Practical Photographer.*

Correspondence.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

Sir,—What is the special purpose or *raison d'etre* of the Photographic Society of Great Britain, and what actual end does it serve? I am tempted to ask the question by your recent remarks suggesting that the existing Society should found classes—in short, initiate a photographic college. At present, I do not see that the Society in any way aids photographers, or advances photography, any more than the numerous minor societies scattered about the country, or nearly as much as the journals, which seem to have become the recognized pioneers of the art, and conservators of the interests of photographers.

For this reason, I am, Not a Member.

COMMERCIAL DRY PLATES.

Sir,—I was very much interested in reading Captain Turton's letter in the Photographic News of July 13th, on "Commercial Dry Plates," as some two or three years ago I sent for a supply of four dozen dry plates, enclosing the order direct to the inventor, and thinking by so doing that he would give instructions for their careful preparation, and was not aware that he had resigned the business to a company. The plates arrived well packed, and apparently in excellent condition. I thought I was well provided for any expedition I might make with my camera. My heart misgave me on trying a plate, for on development it was literally covered with transparent spots and streaks. I tried another and another, thinking there might be something wrong in my manipulations. I tried half a dozen ; they were all alike ; and I at once gave up the idea of trusting to these dry plates on any expedition. I have since, at different times, tried them, and have used them all but half a dozen. I now find that out of the lot I have *three* beautifully clean and bright negatives, but that makes them too expensive for me ; and I refrained from giving another order or trying any other commercial dry plates, as in all probability all other dry plate manufacture would be on a similar principle. The negatives show what an excellent process it is when prepared with ordinary care.

I am pleased to send my most hearty thanks to Mr. J. H. Whitehouse for his coffee process, and should like to ask him whether, in developing the plates, the films have a tendency to become thin and split? Some have done so with me, and I have thought it may be from my bad manipulation ; but, notwithstanding, I am delighted with the process, having secured some beautiful negatives, and shall be content not to try any other process.—Yours truly,

Nelson, New Zealand, November 14. Frank Nairn.

SPOTS ON DRY PLATES.

Dear Sir,—In your number for February 8th appeared a letter on this subject referring to an article by Mr. Mantell in the Year-Book, and which, owing to great demands on my time, I had not previously read. In that article Mr. M. had complained of the difficulty of getting rid of spots in coating plates by the process I so strongly recommended in the previous Year-Book. Had I read his paper earlier I should have written, pointing out the means of avoiding this annoyance (which had also at first greatly troubled me), but Mr. Gordon has so briefly but effectively indicated the remedy that it leaves me nothing to add, except to say, with regard to Mr. G.'s statement that "these plates keep well for six weeks after exposure," that I have exposed one of them *eight months* old, forgotten it, and developed it into a fair picture five months afterwards.

Another point has occurred to me with respect to those plates which I expect you will call "pre-lighting with a vengeance." I quite accidentally left one of them exposed in a dull-lighted room fully a minute. Wishing to try the experiment, I placed it in the camera, exposed it rather less than the usual time, and developed a good picture. I wish some of your readers would try this experiment, as I fear I shall not be able to *look* at my camera for two or three months.

One word more, and I have done. Mr. Gordon gives me much credit for this process, and Mr. Mantell speaks of my "modification" of Canon Beechey's process. I absolutely disclaim any merit, either in the invention or modification. I have not altered Canon Beechey's formulæ or process, and if, as I believe they will, these plates take a high position among dry-plate workers, to him alone the praise is justly due. The utmost I claim is that of practically testing and recommending his plan, and it would give me great pain to dress myself in the "borrowed plumes" of a better man. PHOTO-CHEMICUS.

BALLOON PHOTOGRAPHY.

Sir,—Since writing my communication last week, under the head of "Balloon Photography," I have received letters from Mr. Warnerke, and also from a friend in St. Petersburgh, to whom I had written on the subject. Both these communications tend entirely to exonerate Mr. Warnerke from the imputation which any one would have gathered from the letter of Dr. Vogel, which had already appeared in several journals, and which must have been the result of some misunderstanding on his part,—Yours, &c.,

Manor House, South Norwood. WALTER B. WOODBURY.

BUILDING STUDIOS.

Sir,—Mr. H. Hamilton asks for advice about *building* a studio. If he is a poor man, my advice is, *don't*, but rent or buy one, for I have found studio building to be a ruinous game. If, however, Mr. Hamilton has "siller" to spare, the following hints may be useful to him.

If he build as he proposes, 4 feet 6 inches at the eaves, and 12 feet at the ridge, he will not be able to bring an 8 feet background within 3 feet 6 inches of the north wall. His large panes of glass will require something more than putty and zinc hooks to prevent them from gradually slipping to the ground. The bars of the sash should be as thin as possible, or much light will be lost; to this end, I would advise that he run a couple of iron rods below the glass from east to west. H. H. must keep the interior walls of his studio light in colour, and see that the joists of the floor are not too far apart, and that there is free circulation of air below the boards. If H. H. can do with an iron tie rod or two across the studio from the glass to the south wall, at about 8 feet 3 inches from the floor, he will not require so heavy a sash frame.

Plates will be the best and cheapest roofing for the opaque parts, though I would advise that he admit a little light through ground glass on the south side.—Yours obediently, FRANK M. SUTCLIFFE.

Whitby, Yorks, February 12th.

Proceedings of Societies.

Photographic Society of Great Britain.

The annual meeting of this Society was held on the evening of Tuesday last, February 12th, in the Water-Colour Gallery, Mr. J. Glaisher, F.R.S., in the chair. The minutes of a previous meeting were read and confirmed, and Mr. Frank Bishop was duly balloted for and elected a member.

Mr. Spiller then read his report as Treasurer, from which it appeared that the financial position of the Society was precisely the same as it was last year at the same time. He concluded by moving a vote of thanks to the Auditors, Messrs. Murray and Beasley, which was carried.

Mr. Pritchard (Hon. Sec.) then read the report of the Council.

A vote of thanks to the Hon. Secretary was proposed by the Chairman and carried.

The Chairman announced that a proposal had been made and carried in Council, to present a medal to Mr. Henry White, who for sixteen years performed the duties of Treasurer to the Society in a most admirable manner. The resolution was carried.

The Chairman reminded the Society of a resolution passed last year to award to that member who should contribute most to the actual progress of the science, a medal to be called the Progress Medal. It had been considered and decided in Council that the number of original papers containing much valuable research contributed by Captain Abney during the past year entitled him to that medal, and he now put the resolution to the meeting that such a medal be so awarded. The resolution being carried,

Captain Abney rose to thank the members and the chairman, but also to ask to be excused if he declined the award. The proposal to establish such a medal originated with himself, and he felt that to be the first recipient would place him in an invidious position.

After some further protest and insistance by the Chairman and meeting, it was resolved that the award should stand.

Captain Abney then rose to propose that the Society should devote £7 to two prizes (£5 and £2) for competition in a technical examination to be conducted by the Society of Arts. He had reason to believe, if those prizes were offered, that the Society of Arts would undertake the examination, as they were undertaking other technical examinations. This would be one step towards raising the standard of education and the general status of photographers.

Mr. F. Bedford seconded the resolution, which was carried.

Captain Abney exhibited one of Janssen's photographs of the sun, and explained the method of production.

Mr. Viles exhibited and explained the apparatus he used in producing the fine enlargements of microscopic objects he exhibited at the recent exhibition.

Captain Abney showed two simple heliostats for use with a solar camera.

A number of Mons. Vidal's examples of photochromies were exhibited.

The scrutineers having delivered their report, the following officers were found to be re-elected:—The president, treasurer, and honorary secretary. Mr. F. Bedford was elected as a vice-president in place of Mr. V. Blanchard, and the following gentlemen were re-elected on the council:—Messrs. V. Blanchard, J. H. Dallmeyer, T. S. Davis, Wm. England, S. Fry, and H. B. Pritchard; and Mr. Mawdsley was elected in place of Mr. F. Bedford, who passed to the vice-presidency. After various votes of thanks the proceedings terminated.

South London Photographic Society.

The monthly meeting of this Society was held on the 7th inst., the Rev. F. F. Statham, M.A., F.G.S., President, in the chair.

The minutes of the previous meeting having been read,

The business of the evening was intimated to be a discussion on Mr. Pearsall's paper, "On the Educational Value of Photographic Exhibits," which was opened by Mr. Cocking, who read a paper (see page 75).

The President said, though Mr. Cocking had laid hold of the subject from an artist's point of view, there could be no doubt of the value of photography to the art-student. As a means of multiplying works of art it was impossible to overrate its importance. Alluding to the conventionalism that existed in the manner by which artists represented trees of various kinds, he felt convinced that a more truthful method of doing so would be adopted if students were to follow photographs from nature instead of lithographed drawings.

Mr. Pearsall expressed his gratification at the interest that had been displayed in his paper. What he had contended for was, to place drawing upon a footing to be taught like writing, and he pointed out the analogy between the two.

No other remarks having been made, votes of thanks were awarded to Mr. Pearsall and Mr. Cocking.

Mr. Kennett exhibited a variety of negatives taken on dry plates, and Messrs. Wratten and Wainwright exhibited several prints.

Mr. Ayres exhibited an end-grain block of wood for trimming prints upon, and several guages by which to cut sensitive paper.

Mr. Hore exhibited a number of prints in polychrome, by M. Leon Vidal; and Mr. Thomas Bolas handed round for examination a negative which, when attempted to be transferred from the glass plate, had split into two halves, both suitable for printing.

The meeting then adjourned.

Edinburgh Photographic Society.

The fourth ordinary meeting of the session was held in 5, St. Andrew Square, on Wednesday evening, the 6th inst., Mr. **Lessels**, President, in the chair. The minutes of the previous meeting were read and approved, and Messrs. W. W. Halliburton and Yule were admitted ordinary members.

The principal business of the evening was a demonstration by means of the oxyhydrogen polariscope and other apparatus, of "some properties of glass," by Mr. W. Gilmour. The experiments were thoroughly successful, very beautiful and afforded much pleasure to the members.

After an apology for not having something more immediately bearing upon photography to bring before the meeting, Mr. Gilmour stated that he intended taking them to a closely allied subject, and would make all his remarks "On some properties of Glass" corollate as much as possible round lenses. A lens in its simplest definition, it was explained, was a glass so prepared that the rays of light passing through it were refracted. All simple lenses, however, did more than refract the light passing through them, for they also dispersed it, owing to the unequal refrangibility of the different rays which formed ordinary white light. This property of refraction and dispersion was shown by means of a ray of light from an oxy-hydrogen jet; the amount of refraction being determined by the distance the ray of light was bent out of its straight course, whilst the dispersion was determined from the length of the band of colour produced by the accompanying decomposition of light. Newton, who first discovered the compound nature of light, held that refraction and dispersion were both reciprocal and proportional; that is to say, there could not be refraction without dispersion,nor could there be dispersion without colour; and further, that the dispersion was in a corresponding ratio to the refraction. The apparent truth of this theory was shown by the refraction and dispersion produced by transmitting light through different media, such as glass, water, bi-sulphide of carbon, &c., by means of which it was shown that where a ray of light was much refracted the dispersion was correspondingly great, and *vice versa*. Nearly half a century later, however, another philosopher discovered that by combining substances of unequal refractive and dispersive powers, the dispersion might be got quit of, leaving still a considerable amount of refraction; and referring to the very interesting donation which had recently been given to the Society in the shape of a lens achromatised by means of water, the speaker stated that he had referred to this principle of achromatism for the purpose of showing the achromatic action of the water. This was done by a very interesting and beautiful experiment, in which the decomposing action of the lens was first shown, then the achromatic action of the water, and lastly the residue of refraction after the lens was properly achromatised. Referring next to the refractive action of all transparent substances, it was stated that they might all be classified into two divisions, namely, those that were single refractors, and those that were double refractors. The single refractors required no explanation, but the double refractors were illustrated by passing the light through a crystal of sulphate of lime, and double refraction itself explained and illustrated in various ways. This was done for the purpose of explaining the remarkable property of glass, whereby it might be resolved either into the divison of single or double refracting substances. A perfectly homogeneous plate of glass, for example, was shown by several experiments to be capable of being converted into a double refracting plate, this being done by pressure, by heat, &c. The process of annealing glass was next referred to, and illustrated by several very interesting and beautiful experiments, and the whole of the remarks on double refraction were briefly summarized in their practical bearing on and application to lenses, as stated at the commencement. Not the least interesting part, however, of the communication, though not bearing on the practical aspect of the subject, was the exhibition of plates of an unannealed glass in which the double refracting structure closely resembled the double refracting structure of natural crystallizations.

The **President** said the members were very much indebted to Mr. Gilmour for the great treat that he had given them. His exposition of the somewhat difficult subject had been so clear, and the experiments so well chosen and so successful, that all must have listened and looked with both pleasure and profit.

Mr. **Pringle** said that as Mr. Gilmour had shown how slight a pressure was required to produce diffraction in a piece of glass he would like to know whether the proper action of a lens was interfered with when the ring of the mount, such as is common in French lenses, is screwed tight down on it; and whether in consequence the chemical and visual foci remained coincident.

Mr. **Gilmour** replied that he was not prepared to say that such pressure would alter the focus, but it would undoubtedly affect the action of the lens.

Mr. **Pringle** had been in the habit of heating the camera and lens during the cold days of winter, and had frequently been surprised to find that after such a proceeding the negatives were wanting in crisp sharpness. He had no doubt now that the defect had arisen from unequal heating of the various elements of the lens, producing the diffraction which Mr. Gilmour had so beautifully shown it must always do.

This was followed by an interesting general conversation, in which were more or less discussed the necessity for room to allow the lens to expand, especially in burnished mounts; the change of colour in white glass where too large a proportion of manganese had been used; the cause of iridescence so often found on glass exposed to spray from the sea, &c.

The Council then reported that they had under consideration the question of a presentation for the current year, and in view of the success that had attended the distribution of last session, they recommended that one be given this year also.

The **Treasurer** said that there would be sufficient funds on hand without drawing on the balance from last year, and thereupon the meeting unanimously resolved that a print be presented to every member whose subscription shall be paid before the 1st of April.

A cordial vote of thanks was then given to Mr. Gilmour, and the meeting adjourned.

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held on Thursday evening, the 31st ult., at the Free Library, William Brown Street, the Rev. H. J. **Palmer**, the retiring President, in the chair. The minutes of the annual meeting were read and confirmed.

The **Secretary** reported that the Association soirée had been a great success, and that the balance (about £37) had, in the expectation that the soirée would be an annual one, been placed in the savings' bank for future use.

Mr. H. A. **Wharmby**, the new President, then took the chair, and in the course of his address thanked the members for his election. After alluding to the work of the past session, he threw out hints as to what might be done in the present one, concluding with wishing that the members might have a happy and prosperous year.

The Rev. H. J. **Palmer** then read a paper on "A Farther Improvement in the Gelatine Process" (see page 76). Mr. Palmer, in answering questions on his paper, said that he exposed the films on the front of a glass plate. He also stated that complaints of spots from damp had brought discredit on the gelatino-beer emulsion; but he had just developed some plates that had been stored for a year in a place often filled with steam, and they were absolutely free from fungoid growth.

The **President**, in moving a vote of thanks to Mr. Palmer, alluded to the general wish for a substitute for glass.

Mr. J. A. **Forrest** facetiously replied that he thought it would be a long time before the glass maker's occupation was gone. He remembered that, when the waxed-paper process came into use, glass was said to be doomed; but, though nothing was more convenient and portable than to pack negatives in a portfolio, glass kept still to the fore.

The **Secretary** said that, after seeing the specimens of photochromes which had been lent to them by Mr. J. T. Taylor, a wish was expressed that some more examples should be shown at the meeting, and in response to a letter M. Leon Vidal had most kindly sent a collection of photochromic prints representing models in the Museum of the Louvre, and goldsmiths' work.

The method of producing these was described, and great surprise was expressed at such beautiful results being obtained by mechanical means. The process was admirably adapted for producing illustrations of goldsmiths' and metal work, as by no other means could such work be so exactly and minutely represented.

A hearty vote of thanks was awarded to M. Leon Vidal for giving the members the pleasure of inspecting the beautiful results of a process which M. Vidal had been so successful in bringing to such perfection.

The noted large photograph of the Philadelphia Exhibition, which Mr. F. Gutekunst had so successfully printed on one length of paper, was exhibited. It had been lent by Mr. Davis.

Some excellent prints of dead game were shown, taken by Mr. S. G. Payne, of Aylesbury.

Mr. T. Fletcher's lime light without oxygen gas was exhibited. This was sent by Mr. Lewis Hughes.

The **President** said that he had much pleasure in giving a welcome to the members of the Manchester Photographic Society who had so kindly come down to their meeting. He would ask Mr. Coote, who had brought with him some prints and negatives taken by the favourite process of the Manchester Photographic Society, to show them to the members.

These were excellent examples of the collodio-albumen process, and were examined with interest, the prints, "View on the Llugwy" and "Thorpe Mill," being much admired.

Mr. W. J. **Chadwick** then gave a practical illustration of his method of producing oxygen gas with his compact little oxygen generator, a description of which has lately appeared in the photographic journals. He (Mr. Chadwick) also exhibited his registering carrier for the lantern, which ought to be in the possession of every lantern exhibitor, and showed one of Mr. Woodbury's new travelling cameras, with its several ingenious arrangements.

After examining these and several other interesting objects shown by the members of the Manchester Photographic Society, the meeting was adjourned until the 28th instant.

The members afterwards entertained their Manchester friends to supper at the Angel Hotel, Mr. B. J. Sayce, Dr. Rickard, M. W. Keith, and Mr. I. Knott, honorary members, being present.

The Rev. T. B. **Banner**, M.A., who occupied the chair, said that he had been asked to preside on account of his being the first President of the Association, and one of the oldest members; but, as he was suffering from a severe cold and loss of voice, the Secretary had no doubt chosen him for the reason that, on that account, he could not inflict on them a long speech. He was, however, exceedingly pleased to welcome the members of the Manchester Photographic Society, and hoped that they would see more of each other, both at their meetings, and, if possible, to have excursions together.

Mr. G. T. **Lund** responded on behalf of the Manchester Photographic Society, saying how much pleasure it would give them to meet oftener, and he hoped that their respective secretaries would be able to arrange for some meetings in the summer, when they might be able to try results with favourite processes.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The annual general meeting of the Photographers' Benevolent Association was held on Wednesday, February 6th, at 160a, Aldersgate Street, E.C.

The minutes having been read and confirmed, the balance sheet was placed before the meeting. After being examined by members, the following resolution was proposed by Mr. O'Connor, seconded by Mr. Howard, and carried:—"That the balance sheet be taken as read."

The reports of the Secretary and of the Board of Management were next submitted to the meeting, and it was resolved, on the proposition of Mr. Rolph, seconded by Mr. Evans, "That the Secretary's report and Board of Management report be passed." Carried unanimously.

A letter from Mr. Bassano, of Old Bond Street, was read to the meeting, in reference to his proposal to hold an exhibition at the above address, all surplus profit from the exhibition to be handed to the Photographers' Benevolent Association. The Secretary was instructed to thank Mr. Bassano in the name of the Association.

Robert Millard was struck off the list of members for unsatisfactory conduct.

The following gentlemen were elected as ordinary members of the Association:—Messrs. Windridge and Foxlee.

The election of officers for ensuing year then took place as follows:—

Vice-Presidents—Rev. F. F. Statham, M.A., F.G.S.; J. H. Dallmeyer, Esq., F.R.A.S.

Trustees—Col. Stuart Wortley and Capt. W. de W. Abney, R.E., F.R.S.

Treasurer—H. Baden Pritchard, F.C.S.

Auditors—G. Taylor and L. Sisman.

Board of Management—Messrs. W. S. Bird (Chairman), W. M. Ashman (Vice-Chairman), H. J. Burton, T. Bolas, J. D. Fage, T. S. Hicks, J. A. B. Hall, E. D. Lavender, O'Connor, D. Rheinlander, J. Rolph, and H. J. Thorne.

Secretary—H. Harland.

Travelling Agent—Mr. Ramm.

The proceedings of the evening were brought to a close by Mr. Fage proposing a vote of thanks to the Chairman (Mr. Ashman), which was passed unanimously.

The meeting then adjourned till March 6th, at 8 p.m. At that and all other meetings, the Board earnestly invite all photographic friends.

Secretary's Report.

Gentlemen,—You will hear the Report of the Board of Management. I wish, however, before that is read, to make a few remarks as to the condition of the Association financially, in its past, present, and future state. For the year 1876 the actual receipts were £39 15s. 1d., and the expenditure £58 1s. 5d., thus reducing the balance in hand from £68 16s. to £50 9s. 8d. For the year 1877 the receipts, though less than 1876, show an improvement in the most vital parts, viz., subscriptions from ordinary members, the actual receipts being £35 13s. 4d.; and expenditure, £38 9s. 2d., the latter exceeding the former by £3 5s. 10d. as compared with last year's difference of £18 6s. 4d.

As to the prospect for 1878, I can safely assert that the expenditure, as far as working expenses are concerned, will be considerably reduced. The rent, which for last year reached the sum of £7 18s., will in this be only £3. This is not the only advantage attached to removal of place of business, as all must admit who have visited the former and present office. Another point upon which I wish to remark is the expense incurred for printing during the year 1877. Several alterations in rules having been made at the last annual meeting, a new edition was printed, that would of course be a heavy item, but one that will not be necessary this year, and consequently reduce expenditure in that direction also. Copies of the rules can now be obtained at sixpence each, and all those gentlemen not possessing one, I should strongly advise to obtain it immediately, and, to further the interest of the Association, to circulate it amongst their friends, who probably by that means would become members.

In conclusion, I trust to be able at the next annual meeting to show an improvement in all points. I would impress it upon you that the expenses would be but slightly increased should the Association be twenty times its present strength.

Report of the Board of Management.

The Board of Management tender their thanks to those gentlemen who have kindly contributed to the funds during the year and trust, by a continuance of that support, to be enabled to further develop the benefits of the Association.

Since the formation of the Association, the sum of £50 has been granted for relief, in amounts varying from £7 10s. downwards, to meet the requirements of the applicant, due precaution having first been exercised.

The Board of Management feel confident that the manner in which each case has been considered and finally dealt with would meet with the approval of all members. The number of applicants for relief during last year (1877) being somewhat less than previously is attributable to the fact that by means of the employment register its members have been engaged, thereby rendering such application unnecessary. This fact should recommend itself to photographers generally; and taking into consideration the small sum requisite for membership, and the fact that if one does not require assistance, he is at least helping his poorer brethren who do, the Board would urge all members of the profession to join the Association, feeling confident that it is only the want of being more generally known that prevents its strength being considerably augmented.

The subscription to the Association for an ordinary member is three shillings quarterly, or five shillings and sixpence half-yearly, or ten shillings and sixpence yearly. The advantages offered are, substantial relief when a member needs it; railway fares, to enable a member to reach a situation at a distance; a list also being kept of vacancies at the office. Applications sent to the Board receive prompt attention.

The Board of Management, in bringing its term of office to a close, would urge upon the members the necessity of their active co-operation in the future, and would request them to make known as widely as possible the purposes for which the Association has been formed, and to forward to their utmost the interests of this Association.

There is still one of the objects of the Association that has not yet been developed, viz., granting annual pensions to aged members or their widows. To carry out this object the Board is anxious to form an *Invested Fund*, and respectfully solicits donations and subscriptions, which will be thankfully received by the Hon. Treasurer, H. Baden Pritchard, Esq.

Balance Sheet, Year ending December 31*st*, 1877.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
January 1—				Rent, 174, Fleet Street, ten months	£7	8	0
Cash in London and County Bank... ...	£50	9	8	Rent, 160A, Aldersgate Street, two months ...	0	10	0
Subscriptions from Hon. Members	19	11	0	Advertisements	2	11	0
Subscriptions from Ordinary Members ...	15	14	10	Stationery	0	14	2
Sale of Rule Books ...	0	7	6	Printing	3	7	6
				Postage	2	7	5
				Petty Expenses	0	12	3
				Relief	12	10	0
				Secretary's Salary ...	8	18	10
				Balance in London and County Bank	38	15	8
				Cash in Hand	8	8	2
	£86	3	0		£86	3	0

Audited and found correct, G. TAYLOR and L. SISMAN.

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Talk in the Studio.

MUSIC AND PHOTOGRAPHY.—It will interest many of our readers to learn that Mr. F. A. Bridge, of the South London Photographic Society, with whose musical abilities the members of that Society are frequently made familiar at their social meetings, has been appointed choir-master of St. Martin's-in-the-Fields (Charing Cross). There were nearly fifty candidates. Mr. Bridge is a fine baritone, and is a skilled arranger and conductor of musical entertainments.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—We call the attention of our readers to a report on another page of the annual meeting of the Photographers' Benevolent Association. it will be seen that the Association is growing, although more slowly than, considering its claims, it ought to do. The one thing necessary to secure success in such an association is the general, if not universal, subscription to its funds by operators and assistants in every branch of photography. Such a course alone can make it flourishing and self-supporting. We commend the subject earnestly to the attention of all photographers.

THE LATENT IMAGE.—Describing some experiments on the subject in the *Journal de Physique*, M. Lernontoff observes that it is known that in photography the latent image of the moist collodion is formed by the molecules of grains of iodide and bromide of silver decomposed by the light. It is probable that the product of this decomposition is metallic silver. M. Lernontoff believes he has been able to demonstrate that these molecules of silver form local voltaic couples with molecules of nitrate of silver or sulphate of iron, or pyrogallic acid, of the developer. The action of these couples causes fresh molecules of silver to be deposited on the first, so as to render the image visible.

SOLIDIFICATION OF CARBON BISULPHIDE.—M. Mercier finds that if bisulphide of carbon be added to a mixture of a drying oil and protochloride of sulphur at the moment of mixing, it is entangled in the jelly formed by the oil and protochloride. With boiled linseed oil and ten per cent. of the protochloride a transparent elastic mixture can be obtained containing 70 per cent. of bisulphide of carbon. The substance ignites only with difficulty, and loses the contained bisulphide but slowly.

PYROXYLIN.—Finding, after taking every precaution to rid my guncotton of acid, that the sensitizers employed with the collodion I made with it underwent slow decomposition, I resolved to boil it, when I found that after the acid flavor disappeared an intense bitter principle became extracted by the operation. Washing well then, between each boiling, I continued the latter until the bitterness gradually diminished, and, after some twenty odd boilings, disappeared. The collodion made with this was always stable, it did not discolour, even by exposure to the light, and worked well to the last drop, even after being kept for years. Pyroxylin made with mixed acids only, I presume, would not require this treatment. I made mine with a mixture of sulphuric acid and nitrate of potash, and am persuaded that the source of the annoyance was the resulting sulphate of potash which formed in the fibre of the cotton. The cotton thus prepared has the advantage of so high a degree of solubility that it is possible to make and sensitize collodion and take a good negative with it within an hour.—*Scientific American.*

IODIDE OF STARCH.—The iodide of starch is a definite compound, its composition being represented by the formula $(C_{12}H_{10}O_{10})_3I$. It is decomposed, with regeneration of the original starch, by all sources of nascent hydrogen, and is again produced by the limited action of oxidizing agents in the cold, even by the mere action of the atmosphere. Except when present in excess, iodine is not eliminated by its solvents, such as potassium iodide, benzol, carbon bisulphide, &c., except alcohol, whilst these solvents separate it from the red compound which it forms with dextrin *a*. If kept suspended in water for a year it is slightly decomposed ; a portion becomes soluble in water, which then contains dextrin *a*, colored red by iodine, and hydriodic acid, but no glucose. The insoluble portion retains the same composition.—*M. Bondonneau.*

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To Correspondents.

TRAVELLER.—We regret that we have not much personal knowledge of Normandy or Brittany. You will gain information, however, from Murray and Baedeker's hand-books. Murray's Guide to "Normandy, Brittany, the French Alps, Provence, and the Pyrenees," we should think likely. We should certainly not start earlier than April. A knowledge of the French language is not absolutely indispensable for travelling in France ; but it is of very great importance, and will add materially to comfort and convenience. If you confine your visits to great cities, you may travel all over the Continent with the English language only, as, in most large hotels, there is some one who speaks English ; but the moment you take any of the by-paths (so dear to the traveller), you need the tongue of the country.

L. S. D.—The small white, or yellowish-white, specks on silver prints are, unfortunately, very frequent troubles, and all the causes are difficult to name. Have the prints forwarded been in company with others in which there is any gilt or bronze printing of name and address ? The spots have the appearance somewhat of those produced by the loose particles of bronze from such printing.

SUBSCRIBER.—There are two difficulties in the way of answering your question as to the best and cheapest lens for instantaneous pictures. In the first place, your question is too vague and indefinite. Of what subjects do you wish to produce instantaneous pictures—landscapes, animals, or portraits ? But even if you had stated more precisely what you require, we cannot recommend specific makers by name, or their products, in this column. The lenses of the good English makers are best, and, as a rule, where very rapid work is required, it is necessary to use a portrait lens.

G. B.—Ordinary bookbinder's paste is not suitable for mounting photographs ; it is often sour, and sometimes contains corrosive sublimate. Freshly made flour paste, or starch paste, or tragacanth paste, should be used, if you wish to use paste at all. Glue is, we think, preferable.

R. M. F.—The most probable cause of your film slipping off the plate is the presence of excess of acid in your bath. The use of a tough collodion will favour the same defect, as will also plates imperfectly cleaned. Albumenizing the plates will prove a cure.

D. F.—The mode of intensifying to which you refer is very simple and efficient, but the negatives have the defect of gradually becoming more intense with exposure to light, finally becoming hard, and so intense that they require a very long time to print. The negatives, being fixed and washed, are treated with a solution of bichloride of mercury of five grains to the ounce. When the colour is of an even grey tint, wash, and apply a one-grain solution of iodide of potassium until the negative appears of a greenish grey. If all other conditions are right, the negatives are crisp, delicate, and brilliant.

R. J.—To photograph a polished silver vessel, so as to secure detail in the ornamental pattern, it has been recommended to place a piece of ice inside of it. This, by cooling it considerably, will cause the moisture to condense on its surface very delicately, so as to deaden slightly the excessive glitter. The method of producing pictorial facsimiles of such objects consists in producing a carbon print, or a collodion transparency, of such articles, and transfer to tinfoil or to silver paper. By this means you obtain a metallic picture which is a very close representation of the original.

CALEDONIUS.—Elementary works on art are not at all numerous, and there are none that we know of especially bearing on landscape photography. Mr. Robinson's book on "Pictorial Effect in Photography" is the only work treating of art and photography in conjunction ; but it is out of print. Whether it will be reprinted or not is uncertain. There are various elementary works on drawing and painting ; but the subject of art in its more comprehensive sense has not been, and could not well be, treated in elementary treatises. You will gain art instruction from many works, such as Burnett on Composition and on Light and Shade, and Sir Joshua Reynolds' Lectures, and many more. A good knowledge of art is only gained by making the subject a constant life study.

DODSON.—We prefer grey for the walls, &c., of a studio. Chocolate might answer, but would look a little sombre.

Several Correspondents in our next.

The Photographic News, February 22, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Institute of Chemistry—On Picture-Making in Photography—Copying Music with the Camera.

The Institute of Chemistry.—The Institute of Chemistry does not appear to enjoy the general approbation of our chemists. The Society of Public Analysts, the Chemical Society, and the Pharmaceutical Society are all calling out. The last-named body tells the members of the Institute that they cannot even call themselves chemists. It is only, say the Pharmaceutical Society, those who have passed the examinations instituted by it, and have fulfilled other conditions, who are chemists by law; and as this seems to have been the principal thing aimed at by the Institute of Chemistry, namely, the recognition of its members as lawful chemists, a large amount of the honours claimed by the members of the Institute has been shorn from their backs. Another point of difference is that, while the Institute will have nothing to do with Fellows of the Chemical Society as a body, and will only pick and choose for election those among them it desires to have, the Institute is not above asking the Chemical Society for the use of its rooms in Burlingtom House, and enjoying the hospitality of the older body. It will seem to the outside world as if our chemists are divided into cliques, and that each clique are determined to form a society for itself; in any case, there would appear to be less harmony and good will among scientific men and philosophers than they are usually credited with.

On Picture-Making in Photography.—Without in any way criticising Captain Abney's excellent *Treatise of Photography*, which forms the latest text-book added to the series published by Messrs. Longman, we remark with satisfaction that it contains a chapter on pictorial matters, without which no manual that is at once designed for amateur and professional can be deemed complete. There are so many gentlemen who take a pleasure in working with the camera now-a-days, while, at the same time, it may fall to the lot of any one, at any moment, to take his instrument out-of-doors to secure a scene or pictorial effect, that some art knowledge is indispensable; indeed, except for scientific investigations or record, we might almost say a knowledge of photography is of no use unless its owner knows also somethinng of the principles of art. For this reason we were much pleased to read through a chapter "On the Picture," which is not only lucidly and well written, but is illustrated, moreover, with numerous woodcuts. Captain Abney has several times proved himself a competent artist in the depiction of forest scenery, and the wonderful ruins on the Nile, but, not satisfied with his own talent, he has invoked the aid of Mr. H. P. Robinson. To this gentleman, Captain Abney states in his preface, he is indebted for revision of that portion of the work treating on art matters, and the author shows a wise discretion, indeed, in asking assistance from such a quarter. Mr. Manners Gordon, one of the old masters in dry plate photography, is also laid under contribution, and cuts of some of the latter's most successful pictures are inserted. We find a sketch of that wreck scene of Mr. Gordon's that reminds one so of a bit of Dutch painting, and also of that sea-shore in Wales, a low fisher's hut in the foreground, with a few sheep feeding on a patch of green in front of the habitation, while beyond are seen the hills of that picturesque country. The sheep are grouped so naturally, and their fleeces so soft and woolly that one marvels again at the skill of the photographer. And we happen to know that the picture in question was not the result of happy circumstance, but of much study and forethought. There was not sufficient point in the picture until Mr. Gordon prevailed upon the fisherman to permit some grey wash to be applied to one of the walls of his cottage. Again, in the case of grouping, where figures are to be introduced into a landscape, "On the Picture" gives us many valuable hints that anybody who gives his mind to the matter might readily seize. We are shown in a cut how harmony is secured, and are told what are the particular points to be attended to, to secure such harmony. Many of us know how to take successful pictures. We have tried over and over again, and, benefiting by past experience, have at last succeeded tolerably well in our endeavours. But had we studied the principles of pictorial effect, and known the why and wherefore of a successful picture—for many of us know a good thing when we see it, without being able to say why it is good—the chances are we should not have spoilt so many plates in our abortive attempts to secure a picture. A study of picture-making will repay the photographer better than any other labour he may undertake, and we are glad to find the subject has not been forgotten by Captain Abney in his new manual.

Copying Music with the Camera.—Chorus singers sometimes avail themselves of photography in reducing the size of their "parts"; but we do not think that music publishers make use of the art in the printing of scores. And yet here is an application of photography that should not remain long in abeyance. Large firms like Chappell, Novello, Boosey, and others, who publish oratorios and operas in several editions, would do well to consider how far photography would aid them in the matter. In the case of some of the very popular oratorios, as many as four or five editions are published by one firm, these only differing from one another in the size of their type. What would be easier than securing photographic reproductions of a work of this kind after it has been once set up, and thus avoiding the labour and expense of composing from smaller type for the less costly editions? Having once obtained a large edition of the *Messiah*, or *Elijah*, in bold type, such as is sold for about ten shillings, there would be little difficulty in preparing, with the aid of the camera, smaller editions at (say) five and two shillings. And this method of going to work would have another advantage yet. The smaller hand-books are always imperfectly printed, and lack clearness, whereas a photographic reproduction has neither of these defects. In fact, one of the methods resorted to now-a-days to secure fine lines in sketches and designs is to produce the latter upon a large scale, and then reduee it with the aid of the camera. It is in this way that those tiny, delicate pictures upon the *Graphic Programme* are produced, the fine lines of which have puzzled many an artist and printer. In the same way the "books of the words," that are sold inside our operas and theatres, might be enriched by the music of some of the songs, and photographic reduction being taken from the large printed song in the possession of the publisher. The music would be set out very small, but it would be fine and clear, and, therefore, perfectly legible; such illustrations would advance the value of the book, popularise the air, and certainly add to, rather than reduce, the sale of the music by the publishers. The deep black lines, and the distinctness of the notes, are peculiarly favourable to the reproduction of music by the camera, and it is incomprehensible why music publishers have not called upon the camera for assistance long ago. In the reproduction of maps and plans, and in securing *fac simile* of MSS., photography has for years past rendered valuable service. It is strange the art should not have been applied to the copying of music!

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EARLY THEORIES OF PHOTOGRAPHY.

BY JOHN L. GIHON.

[Mr. Gihon, in commencing a series of papers on photography, in our Philadelphia contemporary, collects a series of historical notes, giving early opinions and theories of sun printing, from which some extracts will interest our readers.]

Photography Three Hundred Years Ago.—"It is claimed that there has recently been discovered a translation from the German, three hundred years old, which gives a clear explanation of the principles of photography. The ancient alchemists understood one of the properties of what we call chloride of silver. They knew that if images were produced by a lens on a coating of this chemical substance, the light parts became fixed in black, and the half tints in grey, while those parts which were not struck by the light were left white. Fabricius verified this in 1566 in his 'De Rebus Metallicus.' In 1760 Tiphaigne de la Roche, in a very singular book, entitled 'Giphantie a Babylone,' supposed himself transported to the palace of the genii of the element, the chief of whom thus addressed him: 'You know that the rays of light reflecting various bodies, paint them on the retina of the eye, on the surfaces of the water, and on mirrors. The spirits have sought to fix these passing images; they have composed a very subtle adhesive material, which hardens very quickly, by means of which a picture is made in the twinkling of an eye. They spread this substance on a piece of cloth, and expose it to the objects they wish to depict. The first effect of this prepared cloth is that of a mirror, near and distant objects being shown upon it; but that which a glass cannot effect this cloth with its viscous covering does, namely, it retains the images faithfully, a process which is the work of the first instant this is received on the cloth. It is taken away directly to a dark place, and an hour afterwards the glazing is dry, and you have a picture far more precious, truthful, and lasting than any that art can produce.' The spirit then entered into a physical disquisition; first, on the nature of the glutinous body which intercepts and keeps the rays; second, on the difficulties of preparing and employing it; thirdly, on the mutual action of the light and the glutinous body. 'Three problems,' adds Tiphaigne, on waking from his trance, 'which I propose to the philosophers of our days.' Thus, if for the 'viscous cloth' of the dreams of Tiphaigne we substitute iodized plates, paper, or collodion, we have the realities of Daguerre, Niepce, and Fox Talbot."

On Latent and Apparent Photographic Images.—"The earliest photographic fact on record is the blackening of chloride of silver (the alchemist's *luna cornua*) by the agency of light. Though Scheele and Count Rumford experimented on this substance, Wedgwood and Sir Humphrey Davy were the first to use it for pictorial purposes. They abandoned their pursuits, however, from their inability to fix their pictures. In making their experiments these philosophers were enabled to judge of their effect by their images being apparent and formed under their eyes; but subsequent discoverers, Niepce, Rev. J. B. Reade, Fox Talbot, Daguerre, and Archer, disclosed a more subtle action of light when they established that latent images, equally perfect, were produced in a much briefer period of time, needing only the proper chemical reagents to make them evident. Into these two classes, latent and apparent, all photographic images may be primarily divided. Chloride of silver is the substance generally used for producing apparent images, as in sun-printing, and it is a curious fact that it was the first material used for the purpose, and is retained to this hour for the same purpose, and is retained to this hour for the same use. For latent images iodide of silver is always employed, and whether it be Daguerreotype, calotype, albumen, wax-paper, collodion, or any other modification, iodide of silver is always the base to act upon."

The Theory of Photography.—"Observation has shown that certain salts of silver undergo change in the presence of certain kinds of light. The change may be visible to the eye, as in the case of the darkening of chloride of silver, or may be ascertained by the behaviour of the salt when certain chemical agents are brought in contact with it, as in the case of iodide of silver in the wet collodion process. It is none the less true that the latter change is as real as the former, though it be invisible to our senses. It is found that lights of certain colours affect the silver salts as well as pure white light, and that those of certain other colours refuse to cause that change. Those coloured rays of light which will effect a change (visible or invisible) are termed actinic or chemical rays, all others non-actinic. When light is decomposed by a prism, we have all the colours of the rainbow shown, and although they pass imperceptibly from one to the other, yet, for the sake of perspicuity, they have been divided into seven colours, which are called primary colours. They are red, orange, yellow, green, blue, indigo, and violet. Experiment has shown that lights of those colours which are included between the green and the violet are actinic, and that of these, those which produce the most rapid change in a silver salt are situated about half-way between the two. With different salts of silver the range of actinic power varies slightly, inclining more or less to the red end of the spectrum. In some future day we may hope that some salt may be found to which red rays may be actinic, thus giving a more truthful complexion to nature as represented in a photograph. It should be remembered, then, that white light only causes a chemical change in the silver salt, because, of its components, some are actinic. It is because the red and yellow rays are non-actinic that coloured glass of these hues is used in our developing-rooms, the light admitted through such glass, if it be of good quality, being incapable of producing any primary change on the collodion film, which contains a silver salt. It must also be noted that when a ray of light is decomposed by a prism into its primary colours, and these be allowed to fall upon a film containing a sensitive salt, a change in the sensitive salt is produced beyond the place where the extreme violet ray is seen. These rays are called dark rays of the spectrum, and are usually denoted as ultra-violet. As these produce a change in the salt they are likewise actinic rays. Such is a short summary of the light which is valuable to photographers, and we shall now discuss the means by which the invisible changes that have taken place in the sensitive salts are made apparent and utilized.

"The sensitive salts of silver which are usually employed in photography are, the iodide, the bromide, and the chloride of silver. In order to illustrate the theory of the formation of a photographic image, the iodide will be taken as a type, the action of light on the other salts being similar. Iodide of silver can be formed in two or more ways: by the action of a soluble iodide, or of iodide vapour upon metallic silver; or by the humid method. This last method is that employed for its formation in ordinary photography: the soluble iodide of a metal, or a metalloid, such as cadmium, ammonium, &c., is brought in contact with a solution of nitrate of silver; the iodine, having a strong affinity for the silver, forms iodide of silver, setting the nitric acid free, which, in its turn, combines with the metal originally in combination with the iodide.

"Plain collodion may be considered, for the purpose of illustrating the theory of photography, as an inactive body, exerting no influence whatever on the chemical reactions that take place, but merely as a vehicle used to retain certain chemical compounds *in situ*. There are certain salts which contain bromine and iodine that are dissolved in collodion, and this collodion is flowed over a glass plate, and allowed to set. After setting, the film is immersed in a solution of nitrate of silver. This film containing the salts is, whilst still moist, taken out of the bath, and exposed to the action of the light; if the rays are directed by a lens, they form an image; if uncontrolled, the chemical change takes place over the whole plate. The chemical change that takes place in the iodide of silver by the light, we have very good reason to believe to be the formation of a suboidide of silver. If no body which will absorb iodine be present this change will not take place, for if we thoroughly wash a plate on taking it out of the bath, and attempt to develop it, after exposure to light no alteration in its aspect will be manifest. It is therefore evident that in wet photography the nitrate of silver plays an important part. In dry-plate photography the action of light is precisely the same, but the free nitrate of silver solution is replaced in this case by some body which will combine with iodine.

"As we have said before, the change to the state of sub-iodide is invisible or latent, and we needs must find some agent which will bring the chemical action to the cognizance of our senses. Pyrogallic acid is a chemical which is well known for its affinity for oxygen, as are the ferrous or photo-salts of iron, the latter tending to form the ferric or per-salts that are to combine with more oxygen. We will take the example of the latter when applied to the latent image. It is based on the assumption that the sub-iodide of silver has an affinity for metallic silver, and, consequently, causes the silver from the free nitrate solution to be deposited by the developer upon those parts acted upon by the light.

"A little consideration will show that if this action take place the image must be on the surface of the film, and not in it. Experience shows that such is the case. The theory of the reduction of bromide of silver by an alkali, as applied to dry plate photography, proves that in that case the image is in the film, and not on it.

"In the practical formulæ for developers, it will be noticed that the addition of (acetic) acid is invariably included. If to a solution of protosulphate of iron (or pyrogallic acid) a solution of nitrate of silver be added, it will be found that there is an almost instantaneous deposit of metallic silver. In fact, this is one method of reducing silver from an old bath solution. Suppose a developer such as this were flowed over a plate which had free nitrate of silver on it; it would be found that an immediate precipitation of silver took place all over the film. The attraction of the sub-iodide of silver (adopting our theory of development) would be rendered void, owing to the rapidity of deposit. If either of the solutions be acidified, the deposition would take place with greater regularity and less rapidity. If it were sufficiently slow, the sub-iodide would be able to attract all the particles of metallic silver as they were formed, and thus build up a metallic image. In practice, the acid added is just sufficient to cause this gradual reduction of the silver. Heat increasing the rapidity of the chemical action, it follows that in decidedly hot weather a larger quantity of acetic acid should be used than in cold. The stronger the iron solution the greater chemical power it will have, and the more rapidly it will decompose the silver solution. As a consequence, with a strong solution, all parts of the picture acted upon by light will immediately become nuclei for the deposition of silver, and the deposit will be of more even density than if a weaker solution had been employed; for with the latter those parts most acted upon by the light—*i.e.*, which had been most thoroughly converted into sub-iodide—having the most attractive force, would draw the deposit of silver to them, and the image would be much more intense at those parts than where the light had less strongly acted. This, which is true in theory, has been verified by practice.

"Any method of increasing the opacity of the developed image, either by changing its colour or rendering the deposit thicker, is called 'intensifying a negative.' The agents used are called 'intensifiers.' Either pyrogallic acid or protosulphate of iron may be employed with nitrate of silver, to cause an increase of density by thickening the deposit of the metallic silver. The reactions here are analogous to those of development, excepting that the metallic silver is the attractive matter instead of the sub-iodide. Both these have the property of assisting the decomposition of the solution of the silver salt, as before stated. The silver must be reduced gradually to the metallic state, when it will be deposited on those parts on which silver has already been reduced by the action of the developer, in the ratio of their densities. When we dip a piece of bright copper wire into a solution of nitrate of silver, on withdrawal we find it coated with a deposit of silver. If, instead of these two metals, we have silver and a solution of chloride of gold, we will find that the gold displaces the silver and produces a change in colour. Any one acquainted with even the elements of chemistry will be aware that a solution of a silver salt added to other chemical bodies, such as bichromate of potash, permanganate of potash, &c., produces a precipitate of a varying colour—in the first case a reddish one resulting. It is found that by flooding a developed and fixed film with certain of these chemicals, a corresponding change in colour takes place. In most cases a preliminary conversion of the metallic silver to the form of iodide facilitates this change. This is accomplished by flowing over the plate a solution of a soluble iodide and iodine. To take another example of intensification by change of colour. If, after the conversion of a small layer of the fixed image into iodide, we flow over it or immerse it in permanganate of potash, we get binoxide of manganese deposited on the silver.

(To be continued.)

FATTY INK IMPRESSIONS BY THE AID OF BICHROMATED ALBUMEN.

BY M. GOBERT.*

The communication that I have the honour to make is interesting to the photographer and to the lithographer. From the photographic point of view, the process which I am going to describe does not constitute a novelty, since the material employed is nothing but bichromated albumen, whose photochemical reactions are perfectly well known. As far as lithography is concerned, the interest appears to me to have a certain importance, since it calls into play a new feature which gives an answer, at least partially, to a weighty question which cannot but occupy the attention of lithographers and printers.

It is known that the quarries which furnish the lithographic stones are not numerous, that they are being worked out, and that France has to depend upon her neighbours for stones of the first quality. The state of things is not new. It is considered grave and important by competent persons, so much so that researches and experiments have been made to remedy it by endeavouring to replace the lithographic stones by other kinds of material. I certainly have not myself undertaken the task of solving this problem; but chance photographic manipulations have brought out some very unexpected and curious results.

Common glass and *plate glass*, directly and without the interposition of any substance, can be used in lithography to replace the stone. It is sufficient merely to roughen the surface of the two kinds of glass, which can be best done by means of acid. It will have been remarked that ground glass is easily and regularly wetted by water, which it is almost impossible to accomplish on a polished plate. It is this property, which up till now has not been utilized, that allows drawings to be made in printers' ink upon roughened plate or common glass. The strong plates of our printing frames are perfect for this purpose.

The following is a brief description of the process:—Bichromated albumen is used, three grammes of bichromate of ammonia being added to one hundred grammes of albumen. This solution, by preference, should be filtered. Covering the plates is very easily accomplished by the very simple means which have so often been described, which goes by the name of the "tournette," or whirling apparatus. The film should be very thin. The plates, which are prepared in daylight, are placed to dry in a dark place. I recommend that they should not be prepared in advance, for they rapidly lose their good qualities. The bichromated and dried albumen becomes insoluble in 6 to 8 hours even in absolute darkness. The sensitiveness of this preparation is very great, an exposure of only a minute to direct sunlight, or four or five in the shade, being sufficient. The light produces insolubility in the albumen, and also, which is more important, a complete imperviousness to water.

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* *Bulletin de la Societé Francaise de Photographie.*

Immediately after exposure, a printer's roller charged with greasy ink is passed over the plate in such a way as to give a black coating to the surface, after which the plate is immersed in a dish of plain water. Those parts not acted upon by light almost immediately dissolve, and carry with them the excess of ink; a clean, vigorous, and sharp image is developed, which adheres perfectly to the plate, and is fit for pulling lithographs from in the usual manner, taking care, however, not to use acid gum, since the least trace of acid destroys the adhesion of the albumen. The gum solutions should be absolutely neutral.

The above description shows that the process is only applicable for the reproduction of subjects executed in line. Up to the present time I have not been able to obtain satisfactory or regular photographs in shades.

In conclusion, I would add that bitumen of Judæa, applied to a ground-glass plate, should also give images of great purity, and capable of being used for pulling-off lithographs; also, by drawing directly upon ground glass with solutions of gum lac, resin, bitumen, india-rubber, &c., impressions may be pulled from original designs.

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PERMANENCY OF CARBON PRINTS.

Writing in *Anthony's Bulletin* on this subject, Mr. Lambert says:—

W. B. C. has an article in the *Philadelphia Photographer* against carbon, patents, &c., He asks: "How do you know that carbon prints will not fade?" I will answer that. I know that a carbon print will not fade for the same reason and on the same principle that I know that a pair of brass boots would be impermeable, that a glass head-rest would be transparent, that an India rubber camera box would be flexible, and that a stone egg would be permanent and incorruptible, though I might not have experimented a whole century to find it out, but simply because I know that brass is impermeable, India-rubber flexible, glass transparent, and stone incorruptible when used in other capacities or for other purposes.

If Indian ink, burnt sienna, British ink, Indian red, madder brown, madder lake, pink madder, sepia, Vandyke brown, Venetian red, and other pigments, used in combination or singly in the manufacturing of tissues, are permanent when applied to a paper or canvas by either the pen, printing press, or brush, they will be equally *permanent* on both paper and canvas if applied by other means, let it be stumps, electricity, or actinic light.

In the British Museum can be seen a manuscript papal bull creating Henry II., of England, "Lord of Ireland," dated 1154, which is not yet yet faded and is simply a carbon print by the hand of man written on parchment, which is simply insolubilized gelatine with pigments, as the prints exhibited at the second annual exhibition held in New York, Dec. 20, 1877, were carbon prints written in pigments on insolubilised gelatine by the hand of actinism. The permanency of one insures the permanency of the other. If Mr. W. B. C. wishes to go further, he will be shown at the Vatican in Rome parchments in various colours which can boast of having stared at eighteen centuries without a blush; if he wishes later proofs he has only to examine every print published in the *P. P.* since its birth, and the only one he will find to have stood the test of a few years' existence is a carbon print by Braun, of Dornach, published ten years ago.

Mr. W. B. C., as a proof that carbon prints may fade, says: "All know that gelatine is affected by the weather; gelatine used to enamel silver prints proved it, &c." Gelatine in its natural state is apt to ferment, rot, or melt; but bichromated gelatine insolubilized by insolation, or changed into parchment, is neither susceptible of fermentation, decomposition, or becoming a solution. The gelatine of an enamelled silver print will be affected by the weather, and will dissolve in water at 70°; but the gelatine of a carbon print is free from permanent deterioration by hygrometrical and climatic differences of the atmosphere, and will in no way be affected by water at 150°, all the gelatine which was really soluble having left the print during the hot development.

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NOTE ON NEW FACTS CONCERNING THE CONSTITUTION OF THE SUN REVEALED BY PHOTOGRAPHY.

BY M. JANSSEN.*

From the moment in which we entered upon the study of celestial photography, on the occasion of the transit of Venus, we have always thought and maintained that photography appeared to us called to play a leading part in astronomical observations.

This opinion has just received a first confirmation in so far as solar photography is concerned. We have succeeded in obtaining, at the Observatory of Meudon, prints of the sun disclosing important facts on this star which have hitherto escaped optical observations. I cannot here enter into details: I will only say that, following certain theoretical considerations, and the study of the results hitherto obtained, I have been led to combine enlargement of the diameters of the images with diminution of the time of the action of the light in order to combat the photographic irradiation.

The solar images have been successively brought to a diameter of 12, 15, 20, and 30 centimetres. At the same time the duration of the exposure has been reduced in the last experiments to about $\frac{1}{3000}$ of a second, this time having reference to the direct action of the sun without the intervention of a refracting medium.

Under these conditions, and taking the most minute precautions to get images of the greatest possible purity, solar images have been obtained having nothing in common with previous results.

Whilst the older images, apart from spots and faculæ, showed no real detail of the sun's surface, the new photographs show this surface as entirely formed by a fine granulation, the elements of which are very varied in form, in size, in relative position, in clearness, according to the regions, &c. This image, each point of which has been formed in $\frac{1}{3000}$ of a second, would require several months to be studied in all its details.

The size of the granular elements is very varied; grains are to be found from some tenths of a second to three and four seconds in diameter.

This granulation shows itself everywhere, and does not seem, as far as we have gone, to present a different constitution towards the sun's poles. We shall have, however, to return to this point.

But the most remarkable result, and one which is due to the aid of photography, is the discovery of the photospherical net-work.

In fact, the careful examination of these photographs shows that the photosphere has not a uniform constitution in all its parts, but that it is divided into a series of figures more or less distant from one another, and presenting a peculiar constitution.

These figures have generally rounded contours, on approximately rectilinear and rambling polygons. The dimensions of these figures are very variable—they have sometimes a diameter of a minute or more. Whilst in the intervals between the figures of which we are speaking the grains are clear, well defined, although of very variable size, in the interior the grains look as if half effaced, drawn out, strained; most frequently, indeed, they have disappeared, to give place to trains of matter which replace the granulation. This would seem to show that in these places the matter of the photosphere is subjected to violent movements which have disturbed the granular elements.

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* Read before the French Photographic Society.

I will not touch at present on the consequences of this fact, which throws light on the forms of solar activity, and shows, as I said some time since, that this activity in the photosphere is always very great, although no spot may show itself on its surface.

The network of the photosphere could not be discovered by the optical means which are used in ocular observation of the sun. In fact, to determine its existence on the prints, lenses must be employed which enable us to cover a certain extent of the photographic image. Then, if the enlargement be sufficient, if the print be quite pure, and, especially, if it has received the proper pose, we see that the granulation has not everywhere the same clearness; that the parts with well-formed grains are delineated as currents which circulate in such a manner as to circumscribe spaces in which the phenomena present the appearance which we have described. Thus, to determine this fact, it is necessary, as we said, to cover a considerable portion of the solar disc, a thing impossible to realize when we view the sun with a very powerful instrument, the field of which is very limited from the fact of its power. Under these conditions we can, indeed, determine that portions exist in which the granulation ceases to be clear or even visible; but we cannot suspect that this fact is connected with a general system.

Already the examination of photographs during a few months discloses differences in the constitution of the photospherical net-work—differences which will give us information on the variations in the forms of solar activity.

I add this very important fact, established with certainty by the photographs, that of the existence of very dark nebulous tracks, showing themselves in the regions of regular granulation, and which indicate that the photospherical layer must have but a very slight thickness.

Solar photography is thus placed, from this time, under conditions in which it can reveal to us most important facts on the constitution of the sun. It is a new method which is opening before us, and the efforts of which we can join to those of spectrum analysis and the older optical methods to solve the great problems which the nature of the sun raises, problems which touch in so many points those of the constitution of the universe.

ON SAVING SILVER AND GOLD IN PRINTING.

BY ROBERT J. CHUTE.*

In photographic printing the margin for saving or wasting is much larger than in the negative department, as the amount of silver remaining in the finished print is said to be less than ten per cent. of that used. It is, therefore, all the more important that every step of the process should be guarded, in order that the large surplus which necessarily enters into the work should be finally recovered and saved.

In making the baths, and in their after handling, the same precautions are necessary as with the baths for negatives. All filters should be preserved, as they are usually rich in silver, especially if they have been considerably used. And in this connection I may say that it is economy to use a filter as long as it works well; that is, it is not necessary to use a new one every time the bath is to be filtered. An old filter is rather to be preferred, so long as it remains whole and is not too much clogged.

In silvering paper the principal saving is in securing the drippings. A glass rod across the end of the silvering-dish, over which the paper is drawn as it is taken from the bath, saves the solution, and leaves much less on the paper to drain. This rod may be secured by a piece of twine to a screw-eye in the table at each end. The floor of the silvering-room should be covered with blotters or any absorbent papers, two or three thicknesses, if necessary, to prevent any of the drippings reaching the floor. These papers should not be allowed to remain too long, or be trodden upon too much, as they may become saturated and ground up under the feet, thereby causing a loss of the silver thus far saved. A box or barrel should be kept as a receptacle for all waste paper, such as blotters or scraps from the silvering-room, filters, &c.

A considerable economy may be practised in the cutting of the paper, though this is important only in view of the prints being trimmed or not before toning. When they are trimmed before toning, the careful cutting of the paper is not of so much consequence; but where they are trimmed after toning, a large saving may be made in the silvered paper by masking the negatives; that is, make a cut-out a trifle larger than the print is to be cut, and place it on the negative in the proper position. It serves as a guide in securing in the print just the part of the negative desired, and permits the paper to be cut so that there is very little waste, for the silver in the paper that is trimmed off before toning is about as good as saved. A separate box or barrel should be kept to receive all these cuttings, as well as all spoiled prints and unused paper.

The first washings of the prints are to be carefully saved, and for this purpose a large tank should be provided. Some printers do their first washing in a good-sized tank with plenty of water, and save only the one washing, while others wash two or three times in a small quantity of water, and save each washing. The first is most in use, I think, however, as it seems most practical, and secures about all the silver there is to be had in this part of the work.

After the washing has been run into the precipitating tank, a saturated solution of salt should be added, in the proportion of about one pint to three or four gallons of washing, and then the whole thoroughly stirred. When the tank is filled and the precipitate settled, the clear water should be drawn off by means of a faucet placed at sufficient height to place a bucket under. To have the prints wash easily and secure a ready precipitation of the silver, the softest water to be obtained should be used for the first washing.

The next and last operation in which silver may be saved is the fixing. And right here I would say that the photographer whose work seldom shows a tendency to fading, is he who never uses a fixing-bath but once. When this healthful method is practised every day the old hypo solution accumulates rapidly, and requires a good-sized vessel, according to the amount of work done. When the tub, tank, or whatever it may be, is about full, a solution of sulphuret of potash is added as long as it produces a thick, black precipitate; the whole is then well stirred, and allowed to settle, after which the clear part is drawn off as closely as it can be without disturbing the precipitate, and the work of filling up and precipitating gone through with again.

The toning process gives us the more precious metal—gold—to use and save; but its recovery is simple, and the method can be described in a few words. The old toning-baths may be poured into a large bottle or earthen pot, and when the vessel is full add a saturated solution of protosulphate of iron (the common sort, such as is sold as copperas, will answer), a little at a time, stirring the liquid well, till it ceases to produce a black precipitate; then let settle and decant. The toning-dish will, after being used for some time, become plated with gold. This may be removed with a mixture of nitric acid, three parts; hydrochloric acid, two parts; and after neutralizing with a solution of bicarbonate of soda, add to the other gold residues.

In saving these silver and gold wastes, the photographer must not expect too much, or try to extract the metals before there is enough deposited to make it an object to work them. Once in three months is probably often enough in most galleries to make a collection of the various residues, and then, by following the directions given in the June number of this journal, the photographer may proceed to reduce them himself, and have the satisfaction of knowing just what percentage he has been able to save.

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* *Philadelphia Photographer.*

The Photographic News.

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NOVELTIES IN PIGMENT PRINTING.

Absolute novelties in photography are very rare, although modifications and improvements are plentiful. In carbon printing there has been little in the way of novelty in principle since Mr. Swan published his process to the world. The novelties in manipulation and improvements in results introduced at various times by Mr. Johnson have been so important that, some of them at least, might rank properly in the category of discovery. Our esteemed Berlin correspondent, Herr Ernest Düby, announced in our last some interesting experiments by Mr. Honikel, which he regarded as involving a distinct and important novelty. Mr. Honikel reversed the usual operations in carbon printing; instead of employing a tissue containing black pigment, and producing a black image on a white ground, he employed a tissue containing white pigment, and transferred his image to a black ground. He believed he obtained finer half-tone in this way, and he would undoubtedly secure quicker printing. In some respects the character of the picture would doubtless be more natural and satisfactory. In the ordinary carbon print the shadows are produced by a raised thickness of black pigment and gelatine, whilst the lights consist of hollows showing the white paper. That the lights should be impasted and the shadows sunken would seem more natural and more in accordance with recognized art manipulation will be at once admitted, and hence a definite gain would seem to be secured by the new method. But there are drawbacks to which we shall refer.

The primary fact that damps our satisfaction in reading our correspondent's interesting communication is found in the circumstance that the idea and the experiment are not new. During the first twelve months which succeeded Mr. Swan's announcement of his process, experimentalists were very busy in trying modifications of the new method of printing, and the use of the white pigment and black ground was suggested and tried by more than one of the active workers which the time produced. Mr. Frank Eliot, in an interesting article in our columns, proposed the use of a tissue containing white pigment in place of black. Another correspondent described some pretty effects produced with white tissue in imitation of bi-coloured cameos. One correspondent, Mr. Firling, of Dorchester, if we remember aright, sent us some glass plates apparently coated with whiting: no explanation of their preparation was given, but we were requested to immerse them in warm water in the dark room. This done, we found an image develop in manner like to a carbon print, and we obtained a picture in white pigment, somewhat resembling a porcelain transparency. In some experiments we made ourselves we mixed zinc white with gelatine, and rendered it sensitive with bichromate. We coated some black ferrotype plates with the white sensitive gelatine emulsion, and printed from a positive cliche of an engraving, getting a white image on a black ground without transfer. But in our own experiments, and in the results of others which we saw, the effect was decidedly inferior to that produced by the ordinary carbon tissue. There are many reasons for this: in the first place, it was difficult to obtain a white pigment of sufficient body or opacity to give vigour to the image and brilliancy to the whites. In painting, white lead is the only substance which is found to possess sufficient opacity to "bear out" well and give a brilliant white, and that is obviously a substance unfit for use in permanent printing. In the next place, and partly depending on the last fact, prints produced with a white pigment had a grey, dull, low tone, utterly lacking in luminosity: the black effect of the surface upon which the image was produced prevailing through all the tints of the picture. Painters know well how much more luminous is the effect of a dark glaze over a light ground than the effect of scumbling with a semi-opaque white or light pigment on a dark ground. Delicacy and regular gradation of half tone were lacking in these prints. In the ordinary carbon process, a transparent colour like Indian ink or sepia being used, every gradation of tint can be secured by layers of different thickness, varying from the effect of a very thin wash of the colour to that of a full body of the pigment; the vehicle, gelatine, materially aiding the delicacy of the gradations. But where a white pigment is used, no such condition is possible, all white pigments being more or less opaque: a thin layer is, of course, more or less transparent, but it utterly lacks that transparent quality which belongs to what is known as a transparent pigment, which permits of the most delicate effect of thin washes, and tints without obscuring the purest surface upon which they are laid. All experience, indeed, in the graphic and tinctorial arts have shown the superiority of a bright, light ground as the basis of a painting or design produced in colours of different depths and different degrees of opacity or transparency; and the few experiments in white pigment printing which came under our attention proved in no wise exceptional to the general experience in this matter.

For purely ornamental or decorative purposes, the use of such a pigment might be found interesting, and might lend itself to some pretty results. If our memory serves us rightly, it was Mr. Henry Cooper who applied the idea to the production of cameo effects. A thick white tissue for producing medallions in gradations of semi-opaque white, the image being finally mounted on a coloured ground, red or brown, or other suitable tint, might produce charming effects, very interesting to the amateur, to whose attention we commend the matter.

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FRENCH CORRESPONDENCE.

Count Courten on Photographing Interiors with the Aid of Mirrors—Captain Waterhouse's Experiments with Gelatine Emulsion—M. Janssen's Solar Photographs—Another Astronomical Discovery by Father Fremy—Analogy between Sun and Moon Photographs.

In a letter which he has just addressed to me, M. le Comte de Courten describes a method he has recently made use of in Italy to obtain rapid reproductions of objects illuminated by a weak light. Under such conditions, it is true, the employment of dry plates would best solve the difficulty, since these may be exposed without inconvenience for days together if needful, but then the result with a weak light would be monotone clichés without relief. It is also possible in such cases to supersede feeble daylight with the electric or oxy-hydrogen lamp; but in both these cases the illumination is still costly and troublesome. The method M. de Courten talks about consists in employing sunlight for his purpose, and turning the same to your purpose wherever it may happen to be. There is scarcely any portion of a building which does not at some time or another allow a ray of light to pierce the interior. It is this ray that must be made use of, and which, by the aid of mirrors, must be reflected upon the object to be reproduced. The mirrors which he employs measure about sixty by eighty centimetres, and, by oscillating them in the least degree, it is possible to spread the light all over the object to be photographed. It is possible, indeed, to manipulate so that the more essential parts are more illuminated than the rest. M. de Courten tells me of many remarkable pictures which he has been able to reproduce in this way, among others the *faïences* of Luca della Robbia, which ornament the interior of the Palais Bargello at Florence. When the camera has been placed in position, and everything is ready for exposure, an assistant is placed at the nearest window with a mirror in his hand, and he directs the reflected rays upon the object in question. This produces an illumination from top to bottom, and although the lighting may seem to be irregular, the result is not the less satisfactory or less harmonious on that account. M. de Courten tells us that under great difficulties this mirror arrangement may be employed with success. Supposing it is desired to reproduce the details of a pulpit in a vast church, where, for instance, sunlight only enters direct from the top. In this case the luminous rays are reflected by a mirror installed near the door, and will have a long distance to travel to the object; therefore, the hand will be found scarcely steady enough to keep the rays within the prescribed zone. By using two mirrors, however, and having recourse to double reflection, the matter is to be managed. The first mirror is placed near the door upon a support which permits of any suitable inclination, and allows it to be put into any definite position. It sends the rays coming from the exterior towards a point first of all fixed upon—for instance, five or six metres from the pulpit. At this point a person mounted upon a pair of steps, and holding the second mirror, is placed, and he will then reflect the rays in a suitable manner upon the object to be reproduced. This second mirror may be either a looking-glass or a silvered screen. In this way M. de Courten succeeded in rendering, by the aid of the camera, the pulpit in the church of Santa Cross, in Florence. The rays of the sun near the entrance portal travelled a distance of twenty-five to thirty metres, and then encountered the second oscillating mirror placed high enough to secure normal lighting. Thanks to this plan of proceeding, then, it is possible to overcome difficulties which at first appear to be almost insurmountable. It need scarcely be said that there must inevitably be a loss of light, but the actinic power of the solar rays twice reflected is still much more powerful than would be the electric or magnesium light.

In a communication which he sends me from Calcutta, Captain Waterhouse tells me that he has made experiments with gelatine emulsion, but that, unfortunately, other work has temporarily interrupted his researches. He says:—"The principal object with which I was experimenting was to find a method of hardening the gelatine so that there would be no fear of the film dissolving under development in hot weather, as it is otherwise liable to do. I found, however, that additions of alum or tannin to the developer had exactly the contrary effect, and seemed to render the film softer and more soluble than before. I succeeded fairly well with some emulsion to which I added about one grain of tannin to the ounce (or $\frac{1}{500}$). For preparing the gelatine emulsion, I have found the method of precipitating by alcohol, as recommended by Messrs. Wratten and Wainwright, most convenient and perfect, and I think that for warm climates it is much better than either dialysis or washing. I make my emulsion at first with less water than recommended by Messrs. Wratten and Wainwright, and so I can accomplish the precipitation with less alcohol, which is an advantage. If I get any better results further on, I will let you know."

I spoke in one of my previous letters of the magnificent solar pictures obtained by M. Janssen at the Physico-Astronomical Observatory at Meudon, and I remarked upon the evidence which these beautiful pictures furnish as to the real nature of the solar envelope. I mentioned further that one of these fine photographs had been placed as frontispiece in the annual of the *Bureau des Longitudes* for 1878, which has just been published. The Academy of Sciences has now received a very interesting paper on the subject from Father Fremy. This gentleman, on examining attentively the specimen in question, at once recognized a striking analogy between the photographic network that is so plainly shown (otherwise called the granulations), and the craters shown in photographs of the moon.

Now, as it is well known that the lunar rings are nothing more than the remains or traces of gigantic gaseous bubbles over the surface of the moon, once in a soft and plastic condition, we cannot but conclude that the same cause has brought about the analogous forms in the sun which was shown by M. Janssen's photographs. The only difference is, that upon the sun these circular forms have but a transitory existence, the mass being in a state of perpetual ebullition. We shall not follow Father Fremy in the development of his idea—or, rather, theory—but we have thought it our duty to cite his interesting views on the subject, if only to show the great importance to which photography has attained in the study of astronomical science. Ernest Lacan.

EMULSIONS FOR PAPER NEGATIVES.

BY CAPT. W. DE W. ABNEY, R.E., F.R.S.

In reading an article in your Year-Book by Mr. Mawdsley, I see that he prognosticates that emulsion will be used for enlargements on paper. It may, perhaps, be useful to say what can be done in regard to the production of paper negatives where emulsion is used. I have for the last few months been engaged in some work in which it seemed desirable to employ paper instead of glass as a basis for the ordinary emulsion; and, after various trials, I found that the following plan answered well in every respect, more particularly as regards cleanness of the back surface of the paper, whilst with careful manipulation the negatives develop admirably. Ordinary smooth Saxe paper is coated with paraffin made as follows:—

Paraffin	50 grs. (about)
Benzole	½ ounce

To which is added enough india-rubber solution made as under to bring the total quantity up to one ounce:—

India-rubber	5 grains
Benzole	1 ounce

To make this india-rubber solution, I have found that if bits of the black india-rubber tubing be cut up into shreds and placed in the benzole, that in time it will dissolve *per se*, though sometimes it takes months to do so. If there be no hurry, this is the best method of obtaining a solution which is free from all turbidity. The india-rubber just swells up to an enormous size, and finally passes into solution with the exception of a small portion of apparently insoluble matter, which floats in the fluid as a gelatinous mass. This can easily be filtered out. Failing this supply of india-rubber solution, it may be made by dissolving the well-known india-rubber paste in benzole. This is never so free from specks as the last solution, but still it answers the purpose.

To prepare the paper I use a cotton-wool brush, the cotton having been previously well boiled in carbonate of soda, and then thoroughly washed and dried. Through a glass tube of about quarter-inch internal bore, and about four inches in length, a loop of string is passed, and a tuft of cotton pulled partially into the bore, a good brush remaining outside. The paper is then brushed over, back and front, with this solution, and the benzole allowed to evaporate spontaneously. A coating of the india-rubber solution (without any paraffin) is next given to one surface of the paper, and, when dry, it is ready for coating with emulsion. The paper is turned up to form a tray, about one-eighth inch side being sufficient, and a small spout is left at the most convenient corner. The paper dish is then supported on a sheet of glass, and the emulsion poured on in the manner adopted for coating a plate; when dry it is ready for exposure.

I need not here enter into the various methods which may be adopted for placing the sensitive sheet in the proper position in the camera, or the method of developing; the one being well-known to calotype workers, whilst in the other there is no deviation from the formula usually employed. After fixing and washing, it is advisable to pass a little dilute acetic acid over the image, as this removes any tendency to a pink colouration which is sometimes observable. The image appears (usually) of an olive green tint by reflected light, whilst by transmitted light it is of a warm black tone. If the last coating of india-rubber be efficient, there is very little difficulty in getting excellent results. If the developer can penetrate to the paraffin there is a danger of a saponaceous matter being formed, which tends, by its contact with the coloured alkaline developer, to tinge the whites. This points to the fact that the pyrogallic acid solution of alkaline developer should be freshly made up, and if this be attended to the discolouration in any case will be but slight. I have produced some hundreds of negative pictures on this material, and they can be printed from without being waxed, when the subjects are not of a very small size, or when they do not possess any great minutiæ in detail.

I have not tried enlargements, but it seems to me there is no doubt that they would be effective.

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ON THE AFTER-EXPOSURE OF NEGATIVES.

BY DR. RICHARD.*

It is well known to be no trifling matter for photographers to take children's portraits in dull winter weather. It is rarely possible in winter to obtain good results with a short exposure when the children are between the ages of one and two years; but still they have to be photographed.

In the summer season, when there is an abundance of light, it is, of course, easy to expose properly; but in the winter season, when the sun is veiled in clouds and mists for many weeks together, we meet with great difficulties.

Under these circumstances we are compelled to devise some method which, notwithstanding short exposure, will give satisfactory results. For this purpose I am acquainted with an approved plan which gives almost startling results. Suppose everything in our laboratory to be in good working order, and we have to photograph a child, or a small group; we endeavour, by means of a camera adapted for after-exposure, to obtain a really good negative.

I exposed for two seconds, on an extra dull day at nine o'clock in the morning, a child's cabinet-size portrait, developed the shortly exposed plate, from which it was impossible to obtain an ordinary print.

For such weakly and shortly exposed negatives I employ a camera for after exposure of special construction which has rendered me extraordinary services.

The camera has a round bellows with a wooden bottom, and a round wooden frame on the top. This bellows is supported by two bearers which separate the circular frame from the base. The bellows is sixty centimetres in diameter, and ten centimetres in height, at five centimetres from the upper ring and downwards I place my carrier, and again one centimetre below the carrier a frame with paper stretched upon it. The negative is next placed in the proper carrier—that is, after it has been fully developed—and a round frame like the cap of a lens put over the camera, resting on the upper ring; over this cap tissue paper is stretched which allows light to be transmitted to the plate.

If these very simple arrangements be made, the camera should be placed in diffused light for three or four seconds, to give the after-exposure, and then be taken into the dark room (where, of course, the arrangements for giving the after-exposure have been made); the plate is then taken out, washed carefully with distilled water, and fixed.

If we compare two equally exposed negatives, to one of which an after-exposure has been given, we shall notice startling differences between the two: one will be a thoroughly good negative of great intensity.

The short exposure which the plate receives during the sitting is intensified by the after-exposure, so as to yield a good negative, but this after exposure should never exceed three-fifths of the whole exposure. What is meant is, that if to obtain a good negative in the ordinary way five seconds are required, then three seconds of the whole may be given by after-exposure.

It is conceivable, if the after-exposure has not been carefully made, and in a proper ratio to the first exposure, that a fogged plate will be inevitable. A second after-exposure is not permissible.

In this way, with the help of the after-exposing camera, we can increase the exposure of two seconds to one of five seconds, which, in good light, is sufficient as a rule. This method gives more perfect negatives than when they are taken in the ordinary way. The action of light on a simply developed picture gives the necessary intensity when fixed.

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JANSSEN'S PHOTOGRAPHS OF THE SUN.

At the last meeting of the Photographic Society, in exhibiting a remarkably fine photograph of the sun, by Monsieur Janssen, Captain Abney said that it was well-known Janssen had taken some large solar photographs in which the surface of the luminary was exhibited in great perfection of detail—far more so, indeed, than could be seen by the eye in a telescope. It was true, with regard to the telescope, that while the picture as seen by it could be enlarged to the same proportions as represented by the photographs, yet the field was so small that the photographs had greatly the advantage. During a visit he (Captain Abney) paid last year to M. Janssen he had an opportunity of seeing his method of working. He was shown some magnificent negatives, a copy of one of which he had asked for South Kensington. The result exhibited was a positive from one of the negatives he had then seen. In one of the negatives he (Captain Abney) had remarked some peculiar markings or smudges in the details. As is well known, the surface of the sun is covered with markings, which look like (and are often called) rice grains. The smudges seem due to some of the rice grains having, as it were, run together. Janssen thought at the time that this appearance was due to our atmosphere, but afterwards, on more negatives being taken at a short interval, it was found that the same markings made their appearance, and then Janssen came to the conclusion that the "smudges" were indicative of vast solar tornadoes by which the solar atmosphere is very much disturbed. Janssen's method of working was peculiar. He used bromo-iodised collodion, silver bath, a tannin preservative, and pyro developer. He never used iron, and preferred the plates dry. He (Captain Abney) had asked his assistant whether Janssen had ever tried an alkaline development, but this he had not done, as he did not think it would succeed. This, however, was not his (Captain Abney's) opinion, and he would recommend Janssen to try this method.

In reply to Colonel Stuart Wortley, Captain Abney said the photograph was taken by a five-inch telescopic objective of about seven feet focal length. The lens was corrected for the chemical rays, but no account was taken of the visual rays.

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* *Photographisches Archiv.*

Correspondence.

WHITE CARBON, ETC.

Dear Sir,—"What's in a name"? When designed to convey a strictly special meaning, a name should be suggestive and permanent, because its intention is to obviate misconception. "A revolution in carbon printing" is at all times an attractive theme, which excites hope and enlivens expectation. The discovery of *white carbon* is, however (apart from diamonds), so startling a revelation, that photographers will doubtless pause and refuse to be persuaded, notwithstanding that carbon *solus*, as a photo-printing medium, has long since lost its chemical or visual identity—red, purple, each and every prismatic hue and tint, passing current and unchallenged as carbon in the (more correctly applied adjective) Autotype system of printing.

As regards the gentleman who has heralded "white carbon," his error, for three reasons, is amply atoned for:—First, he is a foreigner, and probably unacquainted with the English language; secondly, his hearty good feeling towards our Photographic News merits recognition; thirdly, his communications might prove a stepping-stone for an important modification of the existing forms of Autotype or Woodburytype printing.

Its application to the Woodburytype appears to me as an object perfectly feasible. The ordinary mode of procedure would, in such case, be reversed. A transparent positive, in lieu of a negative, white pigment instead of purple, coloured in place of white paper: results somewhat similar to those produced by backing up with black or brown varnish a collodion positive picture. I throw out the hint. "Have you tried it?" interpellates some hypercritical friend. I have not; but the imagination rashly penetrates where hands have not touched, and eyes have not seen.

I note in "Studio Talk" that a M. Lernontoff has demonstrated the establishment of "voltaic couples" between iodide or bromide of silver after exposure to light, and free nitrate, *plus* the agent used as a developer. This agrees with the views I have often expressed in the pages of the News, and which, from various quarters, are receiving verification. I am of opinion, however, that separation of the iodine or bromine does not occur, except under an abnormally prolonged degree of exposure. Several years ago I published some details of experiments I made in this direction, wherein I succeeded in reversing lights and shadows, as naturally they entered the eye of the camera. In a strong light I believe it possible to expose away every vestige of a latent image that is capable of being developed into a visible picture. In this case, probably, an entire separation of the chemical elements that constitute the sensitive salt would occur. Not so where the plate had received a well-timed expose. Here the molecules would be magnetized, and thus induced to form voltaic couples with free nitrate of silver when pressed upon by the developer.

For some time past I have been making observations with a view of elucidating the "blind boy's" enquiry, and seeing men's mystery What is sight? After much cogitation, I believe that I have found a promising clue to this problem. Although I have depended chiefly on my photographic knowledge for providing a reasonable base whereon to build up my theory, it is not strictly speaking a photographic subject, or it would not, perhaps, be so regarded by Mr. Editor, who is not overburdened with blank space. I must, therefore, draw hard up at this point, and stop scribbling by subscribing myself as yours truly,

W. T. Bovey.

[We shall have pleasure in receiving the paper on a subject so nearly allied to photography.—Ed.]

Proceedings of Societies.

Photographic Society of Great Britain.

Report of the Council for 1877.

The Council of the Photographic Society of Great Britain, in presenting their Report for the year ending 1877, will, as is customary, pass in brief review the work done during the session, and briefly glance at any special progress that has been made in the art or science of photography during that year.

In regard to the business of the meetings, it will be in the memory of the Society that, at the close of the year 1876, a trial was made of introducing some particular subject, and discussing it in its various bearings, and in the last Report presented to the Society this practice was hopefully referred to. During the past year the experiment has been repeated with a certain measure of success, though on one or two occasions the members of the Society who were most conversant with the particular subject before the meeting could not be induced to join in it. This is much to be regretted in the interests of the Society, and it is hoped that if such members feel any delicacy in addressing the meeting, that they may be induced to communicate their experiences to the Society's *Journal*, or to prepare beforehand (as was occasionally the case with some members) a short note giving details which would bear upon the subject under discussion.

Perhaps the subject which was more fully discussed than any other was the silver bath; and the Council are certain that new light was thrown on some of the phenomena met with in general practice, but that even then there still was a wide field for open discussion.

In referring to the list of papers read before the Society, it is a matter of regret to the Council that so few names appear as contributors. With two or three exceptions, the communications have been made by gentlemen who are in the constant habit of contributing. It would greatly conduce to the welfare of the Society if, in addition to these gentlemen, other members of the Society would come forward and communicate their experiences. It rarely happens that any photographer does not meet with some phenomenon which may require explanation or elucidation, and if any member would make a note of his difficulties, and allow the Society to discuss them, much valuable information might thus be brought before it. Photography is essentially an experimental science, and progress toward the attainment of perfection can only be ensured by noting every phenomenon which is different to that usually encountered. If, then, members would give the benefit of their note-books to the Society, a much more rapid advance in the required direction would be made. The Council earnestly beg that the above suggestions may be taken into consideration, in order that the Photographic Society of Great Britain may still exist "for the promotion of photography." Still, as regards the progress in the theory of photography, there is much to be satisfied with. Many of the papers have been essentially on the results of research into some of the many unsolved problems still remaining; and it may be pionted out that it is only by maintaining a high standard of *general* papers that the results of researches in photography of any value can be hoped to be communicated to the Photographic Society, since there are so many societies which have acquired a certain prestige, and which are ready to receive the photographic contribution with the greatest advantage to the authors.

The Council have also pleasure in calling attention to the favourable position which the Society's *Journal* now occupies. After a careful consideration, the editor was not limited as to the space which it should occupy, and in consequence it will be found that the last volume occupied seventy pages of printed matter, against fifty-five pages of the year before, the increase being made in the last half of last year's volume. It is hoped that the additional matter to be found in its columns will prove of value, though it does not absolutely belong to the transactions of the Society.

The meetings of the Society have been more largely attended this year than last, and from this fact it may be presumed that its proceedings have been of more interest to the members at large.

The following papers have been read during the year, viz.:—

(1) "Photography from a Holiday-maker's Point of View," by H. Baden Pritchard, F.C.S.; (2) "The Nitrate Bath, and its Defects and Restoration," by John Spiller, F.C.S.; (3) "A Note on the Silver Bath," by Col. H. Stuart Wortley; (4) "Remarks on the Silver Bath," by F. York; (5) "On a Neglected Method of Intensification," by Captain Abney, R.E., F.R.S.; (6) "Further Note on Alkaline Development," by Captain Abney, R.E., F.R.S.; (7) "On the Continuing Action of Light on Sensi-

tive Carbon Tissue," by J. R. Sawyer; (8) "On Emulsions," by Herbert B. Berkeley; (9) "Note on the Silver Bath Discussion,' by R. W. Thomas, F.C.S.; (10) "On Fog-producing Emulsions and their Rectifications," by Captain Abney, R.E., F.R.S.; (11) "On Emulsions" (second paper), by Herbert B. Berkeley; (12) "Theory of the Destruction of the Undeveloped Photographic Image," by Captain Abney, R.E., F.R.S.; (13) "On the Production of Enlarged Photographs of Microscopical Objects," by Edward Viles; (14) "Stray Thoughts on the Exhibition," by Edwin Cocking.

It is in connection with the success of the Photographic Exhibition of the past year that your Council have to offer their heartiest congratulations, both from the financial as well as the art scientific point of view. At no past exhibition have so many of the public been present, the number of persons who visited the exhibition of 1877 being 6,772. Several reasons conduced to such a result—two of which your Society, through its Council, may claim to have caused; viz., firstly, the offering of medal rewards in competition, which most undoubtedly brought together a collection of works upon which much thought and time had been expended, and which illustrated the advance made both in art and science of photography; and secondly, by securing the large series of Arctic photographs which, being their first public exhibition, naturally attracted visitors.

Almost for the first time in the career of this Society, there was a super-abundance of pictures, many more, in fact, than could be hung. This enabled a more careful selection to be made than in former years, and your Council cannot help thinking that this was one of the prime causes of the superiority in respect of the general excellence of this exhibition over many previously held. It is hoped that the next exhibition may be as successful as the last, though it must be mentioned that this year there have been special attractions to visitors which may not exist for the future.

The following analysis of the exhibition, by the Assistant Secretary, is appended, the record of which may be found to be valuable:—

"There were 130 exhibitors; of these 95 were professional and 35 amateurs; 44 exhibitors from London, 71 from the country, and 15 from abroad; 51 were members of the Society, and 79 non-members. Of the 51 members, 24 were from London, and 27 from the country; 35 were professional, and 16 amateurs. Of the 79 non-members, 20 were from London, 44 from the country, and 15 from abroad; 60 were professional, and 19 amateurs. 551 frames were hung, containing 1,382 photographs; of these 565 were portrait and figure subjects; 491 landscape and architectural views; 126 animals and birds; 43 flower subjects; 38 pieces of sculpture; and 118 reproductions, &c.; included amongst these were 77 enlargements, consisting of 35 portraits and 42 landscapes and others. On the table were some of the Arctic photographs, several books and albums containing photographs, making altogether, with those hung on the walls, an exhibition of more than 2,000 separate photographs."

With much regret your Council have to record the loss by death of one of the Society's most distinguished honorary members, viz., W. H. Fox Talbot, D.C.L., F.R.S., a name which will ever be associated with the pioneer discoverers of photography, and of whom we, as Englishmen, must always be proud as the discoverer and investigator of that branch wherein lay the germ of its future practical utility and universal popularity.

In conclusion, your Council trust that the future year will furnish new matter for investigation and discussion, and that your Society will be aided in its endeavours to extend the field of scientific research, not only by the hearty co-operation of its prominent and more active members, but by the accession to its ranks of all who can appreciate, and consequently benefit by, the social reunions which the Society was established to promote.

Obituary.—W. H. Fox Talbot, D.C.L., F.R.S., was born in 1800. Educated at Harrow School, he went to Cambridge, and distinguished himself at that University by gaining the Porson Prize, being Chancellor's Gold Medallist, and graduated in 1821 as Twelfth Wrangler. After sitting two years in Parliament, he retired into private life, and devoted himself to science and literature. He contributed during his lifetime about fifty papers to the Royal Society. In 1826 he published a paper upon light, viz., "Some Experiments on Coloured Flames," and in 1827 "On Monochromatic Light," and as late as 1872 he contributed a paper to the Royal Society of Edinburgh "On the Early History of the Spectrum Analysis." But it was in connection with chemistry that his researches were destined to become so valuable, and some of his earliest papers on the subject were written in 1833, "Researches on Chemical Changes of Colour," and "On Iodide of Silver," &c. On January 31, 1839, Fox Talbot read a paper before the Royal Society, entitled "Some Account of the Art of Photogenic Drawing, or the process by which Natural Objects may be made to delineate themselves without the aid of the Artist's Pencil," as also at the British Association the same year he read a paper on the same subject. Early in 1840 he published the "Calotype" process—being a wonderful advance on everything that up to that time had been produced—a patent for which he took out 1841. The next patent that Fox Talbot took out was registered under the title of "Improvements in Calotype," in which, amongst other things, he included fixing the photographic image on paper by means of the now well-known hyposulphite of soda, a solvent for the salts of silver which Sir John Herschel had discovered in February, 1840. Fox Talbot, in another patent, claimed the use of a transparent and flexible support in lieu of glass, consisting of paper rendered transparent and non-absorbent. In 1852, at the united request of C. L. Eastlake, President of the Royal Academy, and Lord Rosse, President of the Royal Society, Fox Talbot presented his inventions connected with photography to the country, with the exception of, to use his own words, "Photographic Taking for Sale to the Public." Of late years Fox Talbot appears to have turned his attention to other matters besides those connected with light and chemistry, and was engaged for some time in assisting to decipher the cuneiform inscriptions brought from Nineveh. Hereafter, whenever the early history of photography is alluded to, the name of Fox Talbot must always occupy a prominent place, and his whole life is another instance of the power which independent means, when used for the culture of mental gifts, can become. His is a bright example, and it adds a lustre to English science.

Edinburgh Photographic Society.

One of the popular meetings of this Society was held in Queen Street Hall, on the evening of Wednesday, the 13th inst., when an entertainment, entitled "Here and there in England," was given to the members and their friends. The exhibition consisted of a large series of transparencies of English scenery, with Mr. W. H. Davies as lecturer. The pictures, which were highly appreciated by a large audience, were principally produced by Mr. F. York, of London, and kindly lent by him for the purpose.

Dr. **Thompson**, in introducing Mr. Davies, stated that he had kindly taken Dr. Nicol's place, as he was on that evening lecturing in Brechin.

Mr. **Davies** commenced by saying that there was a curious connection between the present war in the East and the subject of lecture to-night, inasmuch as, to a certain extent at least, a similar war—or, at least, a war between the Crescent and the Cross—had exercised considerable influence on much that was about to be shown on the screen. War between the Crescent and the Cross was no new thing, although, perhaps, more forcibly brought before us now than at any period, except once in our recollection. It had, in fact, been raging more than a thousand years, and even now no man would care to say when it would come to a final end. The first portion of the exhibition, he went on to say, which included the Lake districts, showed the uncultivated parts of our country to be pretty much as they ever had been; but proceeding further south, the influence of cultivation and advancement of civilization became abundantly apparent. The East, especially Arabia, as was well known, was the birth-place of much of the science and art that had done so much to bring about the change. There, while our forefathers were little better than barbarians, they were more or less well versed in the sciences of astronomy, chemistry, mathematics, &c., and in the arts, including literature, poetry, and architecture. During the wars already alluded to, our progenitors acquired a knowledge of much of those branches of science and art, and on their return to their native land brought that knowledge into play in many ways, including the erection of most of the buildings that we are about to see, generally called—but miscalled—"Gothic Architecture." Careful examination of the buildings showed that the castles were first erected; and then followed the more refining and peaceful influence of the church; and, between the two, the whole country was almost exclusively appropriated. The same examination showed also that in many cases a long period had elapsed between the founding and finishing of the churches, but this was to be accounted for by the fact that, although the abbeys or churches may have really been finished within a reasonable period, yet each succeeding bishop seemed at once to have set himself to pull down and rebuild, and add to that already built, either with a view to increase the comfort of the inmates, or, what is more probable, minister to his personal vanity.

The exhibition was then proceeded with, commencing with the Lake districts, and proceeding through Yorkshire and the Midland counties on to Oxford, and finishing up in London. A number of the more interesting buildings were passed in review, and some useful information given in connection with each; but some of the audience hardly agreed with the lecturer's estimate of the Albert Memorial, which he described as a highly ornamented and coloured bride's cake. But it is a comfort to know that those who so disapproved had really never seen the erection.

On the motion of Dr. Thompson a hearty vote of thanks was given to the lecturer for the very interesting and instructive lecture.

Photographic Section of the American Institute.

At a recent meeting, Mr. H. J. Newton in the chair, the minutes of the last meeting were read and accepted.

The Secretary remarked that his attention had been called within the past few days to a chemical fact that might be classed as a discovery. We have always been told in books on chemistry that chloride of gold contains, in its pure state, forty-nine per cent. of metallic gold—we have it as a ter-chloride of gold—and that it always contains three atoms or molecules of water; but it has lately been found that pure chloride of gold contains but forty-five per cent. of metallic gold, and instead of three molecules of water it contains forty; consequently when we estimate the cost of prints we find that we can make more prints with $10 00 worth of metallic gold than we can with the estimated quantity as sold. That is, the best chloride of gold contains less metallic gold; and if the water of crystallization is driven off to the fullest extent without decomposition, it still contains four elements of water. This he thought an interesting fact for photographers. Gold, as we buy it, is usually warranted to contain seven and a half grains of metallic gold in fifteen grains of the compounded salts.

Mr. D. C. Chapman stated that at the last meeting there was considerable said on the subject of coloured light. It was stated that one member said that he made a picture with blue glass much quicker than without it. Now he doubted this statement. The only effect that the blue glass produces is to absorb some of the light from the picture, and the contrast of some portions is thus rendered greater; the outlines are stronger, and therefore a contrast is got which is not found without the glass. There is no such thing as primary colour. It is one continuous stream of wave lengths for the space of an octave. There is no such thing as a fixed colour. Every different length of vibration of light gives a different colour. He had been all over the ground, and knew what coloured light would do. When light passes through blue glass, some of the rays of light are stopped. What we call white light is nothing but the confusion of all the wave lengths, which press on the optic nerve. For instance, if the waves are waves of 300,000, the eye is acted upon by waves of that length. Light passing through blue glass is not changed, and acts on the chemical substances the same.

The President remaked that colour was purely a sensation. The varying colours were the result of the peculiar excitation of the optic nerve by different wave lengths, which are conveyed to the sensorium or perceptive faculties. The result of this excitation and perception is what we call colour. The position assumed, as I understand it, is, that the light from the subject to be photographed, having a variety of colours, is modified or changed in its passage through a coloured medium to the ground glass, that yellow appears green, &c. The question is, whether the eye is a correct interpreter of the different wave lengths or not; and if the yellow be actually changed to green, or simply if it be an illusion. He (the President) could not adopt the idea that blue light would photograph quicker than white light, unless it could be shown that the white light, in passing through a blue medium, had some retarding agent filtered from it in the passage. All the blue rays benig contained in white light, such a proposition would be equivalent to saying that a part is equal to the whole.

Mr. Chapman said that when a camera is focussed on a yellow light behind blue glass it is focussed on the yellow light that comes through the glass. It is a yellow image just as it was before. Now if we interpose a prism, we separate this yellow and blue. The camera is not deceived by the coloured glass. The image is not composed of green light. All light, except that which comes from the sun, is reflected light, and no matter what is interposed between, the light is reduced in power.

The Secretary remarked that he had green and orange, and green and ruby in his dark room windows. The ruby glass will stop all the actinic light. A piece of ruby-coloured glass may be placed over photographic paper and put in the sun for a week, and the paper will be white still. By blue light he produces more harmonious pictures than he had been able to do by the use of any other tints.

Mr. Chapman said the only advantage blue light has is, that it is more comfortable to the sitter, and a more composed, natural, expressive picture is the result.

Mr. J. Chisholm remarked that, with blue light and a long exposure, he thought he got a better picture.

The President said his impression was, from the experience of others, that for copying oil paintings the blue light possessed an advantage.

The Secretary claimed that blue light would make a more harmonious picture than could be had without it, for the reason that the chemicals recognized a difference, and work under more favorable conditions. But one great trouble encountered in the use of blue light is that too great quantity is used. The proper shade is of much importance. By looking at a yellow object through blue glass it looks green, and red seen through blue would appear purple. The question is, do we, by interposing the blue, change the red into a purple, which is a more actinic colour? There seemed to be no doubt, in his mind, that the interposition of blue glass of the proper tint does accelerate the work and add to its intrinsic value. He was aware that he stood alone upon this ground, yet he proposed to hold his position until driven off by clear demonstration of its no longer being tenable.

Talk in the Studio.

Lighting and Retouching.—It may interest some reader to know that in Rembrandt style, retouching may be avoided; I never retouch, but shade the model as I would like it to appear in the finished print. Freckles I reduce in this manner, and have found it quite successful:—Let the person rub the face well with a rough towel, and when in a glow photograph with a good exposure and a little front light. If you have no front light, then turn the face well round to a good side-light, which, in my opinion, is preferable, as it does not flatten the image, by having the curtains drawn on the opposite side light. If these rules were followed, very little retouching would be required, even for a freckled person, because it stands to reason that the likeness must be lost if these rules are not followed, because a great deal of retouching would be required otherwise. Another thing I have found to improve my Rembrandts is to cover the side light the person is facing with a piece of fine muslin; this I have found a decided improvement, as it softens the light wonderfully.—A. Clarke, Jun.

"Our Boys" Photographs.—On the occasion of the one-thousandth consecutive representation of Mr. Byron's "Our Boys," at the Vaudeville Theatre on Tuesday night last, one of the noteworthy incidents of the evening was the distribution among the audience of sealed packets, each containing a photographed group of the leading performers in the comedy. The photograph was excellent.

How to Attach Photographs to Glass.—W. T. Watson, of Harriston, Canada, gives the following method to fasten photographs on glass without leaving air-bubbles, and also how to make them transparent:—Allow the photograph to remain in water until thoroughly soaked, then place between blotting-paper. It should remain until it is just damp enough to be pliable. Then coat the face of the picture with good paste made from flour or starch, and lay face on the glass. Commence in the centre of the picture, and rub outwards toward the edges to dispel all air and paste. Be very careful not to get paste on the back of the print. Keep it damp with a sponge until the rubbing is finished, being careful not to break the surface of the paper. When perfectly dry, lay on a heavy coat of castor oil, and it will soon become transparent. If too much oil, rub off the surplus with a cloth. Allow it to stand a day or two, when it may be coloured.—*Scientific American.*

Copyright in Photographs.—At the Aston Police Court, on Friday, Edward Sprawson, photographer, was fined £6 and costs, being 10s. each in twelve cases, for photographing and selling copies of certain registered portraits of Midland Railway officials, the property of Messrs. W. H. Beynon and Co., fine art publishers, of Cheltenham. It was stated that the portraits in question had been sent to the defendant to frame, and that he then took copies of them. The defendant pleaded ignorance of the portraits being copyright, and said that only about fifty copies had been sold.—*Times.*

CEMENT FOR UNITING METAL TO GLASS.—The following are given by correspondents of the *English Mechanic*:—"1lb. of shellac, dissolved in a pint of strong methylated spirit, to which is to be added one-twentieth part of a solution of india-rubber in carbon bisulphide; or take 2 ounces of a thick solution of glue, and mix with 1 ounce of linseed oil varnish, or ¾-ounce of Venice turpentine. Boil together, agitating until the mixture becomes as intimate as possible. The pieces cemented should be fastened together for a space of forty-eight or sixty hours."

MAKING PAPER TRANSPARENT.—Artists, designers, decorators, architects, land surveyors, and surveyors, and all who have occasion to make use of tracing paper in their professional duties, will be glad to know that any paper capable of the transfer of a drawing in ordinary ink, pencil, or water-colours, and that even a stout drawing-paper, can be made transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper be damped with pure and fresh distilled benzine it at once assumes a transparency, and permits of the tracing being made, and of ink or water-colours being used on its surface without any "running." The paper resumes its opacity as the benzine evaporates, and if the drawing is not then completed, the requisite portion of the paper must be again damped with the benzine. The transparent calico, on which indestructible tracings can be made, was a most valuable invention, and this new discovery of the properties of benzine will prove of further service to many branches of the art profession, in allowing the use of stiff paper where formerly only a slight tissue could be used.—*The Mirror.*

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To Correspondents.

CONSTANT READER.—We do not know of any complete list of photographers in either town or country. You will find a list of a few hundreds of them in the list of members of the Photographic Society of Great Britain.

A. M.—The use of plate glass very perfectly cleaned is the best aid to the film leaving the glass when required. An imperceptible film of wax also aids the matter. Dissolve some bees'-wax in ether, or in an essential oil like that of lavendar, and rub a little over the glass, then rub well with a clean cloth uuiil no trace of the wax is visible. Use a tough, non-powdery collodion, and allow the negative to remain a sufficient time in the acid and water. Patience and skill are the chief aids.

R. T. W.—A thermometer placed beside the plate, so as to be in the same temperature, will enable you to ascertain that the plate is in the temperature mentioned. Drying boxes are made in various ways. We have one in which a deal box, about two feet in length by one foot in depth and breadth, has a pipe of tin passing through it. The bottom of the tube is funnel shaped, and passes through the bottom of the box, so that a lamp or gas burner can be placed to stand within it, the heat ascending through the pipe and warming the box.

HUGH WALKER.—We regret that the case you describe is not one in which we can give you efficient help. It is a case for a solicitor; and yet we are not sure that a legal remedy might not be worse than the trouble itself. Possibly the Editor of the journal in question, knowing his contributor, may help you. We should commend you to apply to him.

S. G.—The best kind of collodion for copying printed matter is a ripe collodion of good body, of a brown sherry colour. An iron developer containing ten grains of the protosulphate of iron and twenty minims of acetic acid to an ounce of water. If you wish to prepare the collodion, add five grains of pyroxyline, made at a high temperature, to an ounce of equal portions of alcohol (sp. gr. 820) and ether; iodide of ammonium four grains, bromide of cadmium one grain; mix, and use a few months after mixture.

R. R. F.—The application of a solution of corrosive sublimate to a negative with stain of red fog on the shadows does not remove the fog, but by changing its colour it prevents it being very mischievous. The stains, although being red, spoil the negative for printing, as they are represented in the print by white patches, the non-actinic colour causing them to show considerably. The mercury salt changes the red colour to white, which obstructs the passage of light very little, so that in the print their presence is scarcely noted.

R. G.—As a rule, a substance suspended in a solvent is more readily dissolved than when it rests at the bottom. Generally, we have found that nitrate of silver is best aided to dissolve in alcohol by triturating the salt in a Wedgwood mortar with a portion of the alcohol. It is a good plan to powder the salt, add a few drops of water, and then use absolute alcohol.

F. CLENTON.—It is better that a developer should be modified to suit the special subject, the condition of the light, &c. As a rule, a solution of protosulphate of iron containing from ten to fifteen grains per ounce of water, and from fifteen to twenty minims of acetic acid, will answer well for landscape work. The developer should be kept on the plate generally, until all the details are out. The term architectural photographer is generally understood to mean that the photographer has given especial attention to the photographing of architecture. A skilful photographer will be able, of course, to photograph any object, but he will do fuller justice to his subject (say architecture) by knowing something of its especial points of interest. A photographer with some knowledge of and feeling for architecture will choose the best point of view, the most suitable light, and do the fullest justice to the most important features. There is much room in architecture for the exercise of this discrimination.

MANCHESTER.—Roughly estimated, a saturated solution of sulphate of iron contains half its weight of the salt. Hence two ounces of the solution containing one ounce of the salt, added to a pint and a-half of water, would give you a developer containing a trifle more than fifteen grains to the ounce.

Z. X.—From your description, doubtless an ordinary landscape lens. It will probably cover a plate ten by eight. A bellows camera extending twelve inches will serve for ordinary landscape work.

Several Correspondents in our next.

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METEOROLOGICAL REPORT FOR DECEMBER.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven, 36 feet above sea-level.

Date.	Barometric Pressure.			Temperature in the Shade.			Remarks.
	Morning	Noon.	Night.	Morning	Noon.	Night.	
1	29·10	29·36	29·51	39°	46°	44°	Fair, generally cloudy
2	—	29·96	30·17	41	48	32	Fair, generally sunny
3	30·12	30·12	30·05	31	—	42	Fair, but cloudy
4	29·92	29·85	29·85	42	—	41	Fair, but cloudy
5	29·32	—	29·53	49·5	47	42	Fair, but gloomy. Wind at night.
6	29·09	29·03	29·20	44	44	47·5	Rain nearly all day. Very stormy
7	29·58	29·60	29·80	44	44	47	Showers a.m. and p.m. Windy
8	—	29·91	29·98	44	45	46	Small rain a.m. and p.m.
9	29·89	29·76	29·72	44	47	45	Rain all day
10	29·70	29·73	29·78	43·5	43	41	Rain nearly all day
11	—	29·68	29·38	43	43	43	Continuous rain from 3.30 p.m.
12	29·30	29·48	29·62	45	43	41	Heavy showers a.m. Windy.
13	29·52	29·58	29·71	43	43	41·5	Showers of hail and rain a.m. and p.m. Windy
14	29·98	30·07	30·18	32	44	43	Fair, generally sunny
15	30·17	30·03	30·07	43	45	47	Rain commenced at noon, & continued till 6 o'clock
16	—	30·15	30·19	48	49	47·5	Fair, but very gloomy
17	30·10	30·15	30·22	44	44	43	Rain a.m. and p.m.
18	30·38	30·40	30·57	38	46	45	Fair, often sunny
19	30·37	29·41	30·50	46	46	40	Rain early this morning. Fair, but gloomy the rest of the day
20	30·44	30·40	30·30	38	44	48	Fair, but dark and misty
21	30·27	30·24	30·20	48	49	49	Rain at night. Gloomy
22	29·92	—	29·64	49.5	51	44	Small rain p.m. Windy
23	29·88	29·90	29·88	40	44	45	Slight showers a.m. and p.m. Windy
24	29·45	29·47	29·59	43	44	33	Showers a.m. Strong wind all day.
25	—	29·42	29·18	28	33	36	Snow showers p.m. Heavy at night.
26	29·07	29·10	29·18	35	38	35	Snow showers p.m. Heavy about 3 o'clock
27	29·20	29·	29·58	35	—	39.5	Fair, generally bright
28	29·73	29·70	29·48	30·5	39	38	Rain commenced about 3.30 p.m. Windy
29	29·[illegible]	29·30	29·39	48	48	46·5	Rain this morning
30	29·40	29·47	29·42	47·5	48	41	Rain nearly all day
31	29·82	29·30	30·09	41	45	41	Fair and sunny.

Summary.

	Mornings.	Noons.	Nights
Highest temperature	49·5°	51°	49°
Lowest ditto	28	33	33
Mean ditto	41 2	44·6	42.4

Mean of all observations	42°·7
Days on which rain fell	20
Fair days	11
Fair days gloomy	6
Fair days bright	5

Thus the temperature of December, 1877, was somewhat above the average

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PHOTOGRAPHS REGISTERED.

Mr. LAMBERT WESTON, Dover,
Seven Photographs of Rev. J. L. Lyne.
Mr. J. USHER, Ramsgate,
Photograph of Mr. Hurst.

The Photographic News, March 1, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

What the Photographs of the Sun and Moon Tell Us—The Paris International Exhibition.

What the Photographs of the Sun and Moon Tell Us.—The camera has now made good its footing among scientific instruments, and must henceforth be regarded just as much a piece of philosophical apparatus as the microscope or telescope. No astronomer's observatory can be deemed complete without a camera, and in the physicist's observatory it is a most useful, if not indispensable, adjunct. Investigations concerning light and heat are only to be conducted in all their completeness by the aid of a sensitive plate, for this is able very frequently to tell us more than the eye can see. It has been proved over and over again that the camera possesses far more delicacy of discrimination than the human eye, and that lines in the spectrum or faint illumination, especially of blue or violet, are more easily discerned by a collodion film than by the retina. In astronomy, the camera long ago proved its value, and it has now, apparently, left all other instruments behind as an investigator and discoverer. Hardly have we become familiar with one wonder it demonstrates, than we hear of another. The astronomical studies carried out by means of the camera by such men as Rutherfurd, Draper, De la Rue, Vogel, and Janssen, are familiar to us all. Rutherfurd, of New York, not content with solar and linear pictures, attacked the stars, and we have seen how skilfully that well-known astronomer was able to map them out upon a silver plate. It was impossible, in reproducing stellar groups, to expose a plate instantaneously, the light of these far-off bodies being so weak; but this difficulty is at once overcome by a heliostat, properly timed to overcome the motion of the earth. But even this was not enough to secure a trustworthy record, for the images of the stars upon the collodion film were so marvellously minute that one could not but hesitate in deciding whether the tiny speck were really the record of a heavenly body, or only an accidental impurity in the silver bath. Rutherfurd's plan of preventing any doubt of this kind is to stop his heliostat for a while during the exposure, and then the star markings are all found represented by double images, and it is only these pairs of dots which really represent stars. Rutherfurd's enlarged pictures of the moon, some three feet in diameter, may be said to have taught us more concerning that orb than the results of any previous observer. That it is a burnt-out luminary, for instance, there can be little doubt, on glancing at the magnificent pictures of the renowned American astronomical photographer. There are craters innumerable over its surface, the latter with every appearance of a cindry character, and looking very like pumice-stone. Any portion examined under a magnifier is so real and tangible that one feels it is possible almost to walk over the rugged surface. The Rutherfurd moon photographs, in a word, are marvellous, and the map of a known land is hardly more precise in its details than these maps of an unknown orb spread out before us. The details are wonderful, and have done much to control the theories of astronomers gone before, while speculators must hereafter be very careful in what they advance as to the nature of the moon with all these facts in front of them. And now we come to the last discovery of photo-astronomy. Our readers know that M. Janssen has succeeded, by giving a very short exposure indeed, in showing us a picture of the sun which contains something more than a few blotches or so-called sun-spots. By uncapping the lens for the limited period of one three-thousandth part of a second M. Janssen has succeeded in securing a picture of the sun with marks of two kinds—some granular, some elongated or willow-leaf in shape. A magnified examination of these markings by Father Lamey, a French astronomer, has led to the remarkable discovery that the markings upon the sun and the moon much resemble one another. M. Lamey believes he can trace without difficulty, upon the solar pictures of M. Janssen, appearances that resemble the craters plainly shown in the Rutherfurd moon photographs. In the latter case, the craters are in a stone or cindry material, and, therefore, appear set and firm, while in the sun, which is in a state, so we suppose, of constant ebullition, the craters are only momentarily formed in some pasty portion of the sphere. One can well imagine large bubbles in a molten mass, the bubbles constantly bursting, and thus momentarily forming craters. Well, it is phenomena of this kind which Lamey tells us he discerns in the Janssen photographs, and which have arrested his attention. When the sun has burnt itself out, then we shall have an orb similar to the moon, of a light, pumice-stone character, and with burnt-out craters such as the moon now permanently exhibits. In both cases there are craters observable now, but in the one instance they are fixed, and in the other are simply the result of a seething mass of combustibles. It would be hasty on our part to conclude that Père Lamey is altogether in the right as to his views; indeed, plausible and ingenious as is his theory, there is much yet to be considered in regard to it. Yet, so far, we can at any rate congratulate ourselves. We have found out that there is a very distinct resemblance between the living sun and the dead moon, and that this discovery has been brought about wholly and solely through the medium of the photographer. The blinding light of the sun has hitherto baffled the means at the disposal of the photo-astronomer, and it was not until a capable man like Janssen, who firmly believed in the camera as the instrument of the astronomical investigation that took the matter up, that we arrived at this state of progress. Rutherfurd's moon pictures, and Janssen's photographs of the sun, stand out as two wonderful results in recent investigation, and prove beyond question the indispensability of a knowledge of photography by all those who would follow this branch of science. It was during the transit of Venus observations in Japan that Janssen became thoroughly convinced of the part the sensitive film was to play hereafter in the matter of recording natural phenomena, and since his return from that expedition he has never lost sight of this idea. Convinced of the utmost importance of photo-astronomy, M. Janssen never rested until he had prevailed upon the French Government to grant him the Chateau of Meudon as a physical astronomical observatory; and how well he has made use of the means placed at his disposal all the world is now aware.

The Paris International Exhibition.—The Paris Exhibition for 1878 will be before the world in a few weeks' time. Its opening is definitely fixed for the first of May, and electric lights have been fixed at the Trocadero and Champs de Mars to enable workmen to proceed with their labours as well by night as by day. Unfortunately a good deal of uncertainty prevails as to details, and no one, apparently, seems to be aware of the latest date for sending in exhibits. The fifteenth of April, or one fortnight previously to the opening, is mooted as the date in question, but nothing definite has been to our knowledge lately published. The English staff, with Mr. Cunliffe Owen, C.B., at its head, have for a long time past been busy in the French capital, and have taken up permanent quarters in a building nearly opposite the principal entrance to the Exhibition; at the same time, there is also a Commissioner's office at the South Kensington Museum, where enquiries may be addressed. In the face of the Eastern difficulty, it is as yet somewhat premature to predict the success of the Exhibition. Germany has adhered to its decision not to take any official part in the matter, and Turkey will hardly be represented at all. Russia promised to do what she could, and Austria too, but how far they will perform is another question. The Parisians, however, have no reason to be disquieted. Englishmen and Americans are only too glad of any excuse to visit Paris, and the aristocracy of Europe have likewise no alternative but to pay Paris a periodical visit. And when would be a more fitting time than on the occasion of the International Exhibition for 1878?

THE MODERN MAGIC LANTERN.

BY WALTER B. WOODBURY.*

This instrument—still best known by its old unscientific title—has, I think, in no part of the world been more used and experimented upon than in my own native town of Manchester, and therefore I consider it the most fit place to make a few remarks on those in present use. In order that all honour be given to the person to whose researches we owe our present compact and powerful oil lanterns, I wish it to be more widely known that the honour belongs to Mr. Marcy, of Philadelphia, who spent many years in working out and completing what he very appropriately named the sciopticon.

The instrument itself requires no description to members of the Society, as I believe they nearly all possess one—its chief features, as you know, being a narrow double flame placed edgeways to the condenser, and its very compact body, which does not much exceed the latter in diameter.

Now, next to inventing something useful myself, there is nothing gives me greater pleasure than to introduce a foreign invention which I think may prove of use to my fellow-countrymen; therefore, when in America some six years ago, and seeing the advantages of Marcy's invention over the clumsy ill-lit things we were using, I determined to introduce it into this country on my return, and arranged with Mr. Marcy accordingly.

As I expected, the instrument became a great favourite with the scientific public, and no greater proof of its value could be shown than in the number of imitations that have sprung up more or less copied from it. Among others we have the euphaneron, the lucidus lantern, the eureka lantern, the excelsior lantern, Steward's lantern, Jones' lantern, and, in fact, anybody's lantern who chooses to order a sufficient number and have his own brass plate attached. Those I have just enumerated are all manufactured by the gross and by the same firm, and, with the exception of the title plate, are identical.

One departure from the Marcy form of wick is found in these, viz., that of dividing it at one end, which I think to be a mistake, as it nullifies the chief feature in the sciopticon, and is really bringing us partly back to the old circular or broad wick, besides other disadvantages. On my return from America I tried a variety of forms of wicks, as well as the triple, but came to the conclusion that no improvement was effected.

There are also new forms of lanterns in the markets, but on examination they will all be found to have some parts copied from Marcy's sciopticon. Among other illuminating powers (oxhydrogen always holding the foremost place), we have a small lamp which the reader (Mr. W. J. Chadwick) will introduce to you, and which I have styled the "pyro-hydrogen lamp," the history of which it will be as well to lay before you.

As far back as the year 1828, in the records of a celebrated patent case, occurs the following:—Alderson, B., said—"The bluring apparatus was perfectly well known, the heating of air was well known, the tuyere was well known as applicable to blast furnaces; then what he really discovered is that it would be better to apply air heated to red heat, or nearly so, instead of cold air. That is the principle—that is the real discovery." Here, I suppose, we have the first mention of the principle which has since been applied to hot-blast blowpipes.

The first attempts that were made, as far as I can learn, to apply this principle to lighting purposes, took place some seven or eight years ago, and chiefly among the members of this Society. A number of experiments were tried by Messrs. M. Noton, Webster, Fletcher, Pumphrey, Winstanley, and others. Whether these gentlemen aimed too high, or that the matter proved a failure, certain it is that for seven years it remained in *statu quo;* and when, upon applying to Mr. Fletcher, of Warrington, early last year, to manufacture for me the particular form of apparatus you see here to-night, he assured me that the system had been tried by himself and others, and had entirely failed, at the same time trying to dissuade me from going on with its manufacture.

The lamp before you is of German invention, having been somewhat modified by myself for lantern use, with a steady pressure of air, which I find is best obtained by turning the water pressure into a large barrel, or other convenient vessel, and taking the air from a small tap at the top the light burns steadily all the evening, the lime being hardly affected, and, if put away in an air-tight case, may be used for months.

I will say nothing of its "candle power"—that I will leave to those who choose to test it; for since the introduction of those two words in connection with magic lanterns they have become so common that thousands of candles are advertised with the greatest recklessness, and without stating how many are lighted, or whether they are not the small ones in use to adorn Christmas trees.

GOOD ADVICE.

BY J. BAKER.*

"Despise not the day of small things."

"It takes a great deal of thorough faithful work to make a good photograph." So spoke a friend, not a photographer, but an artist, who is familiar with, and was observing, the minutiæ of the gallery work; that is, exactly so thorough, faithful, patient work, attention to every point of little detail; to learn to know the very beginnings of disorder. A few pinholes are the precursors of a host. A little greasiness in the developer is the sign that you will presently lose some plates. The collodion is a trifle thick, a few plates farther on it will be gummy. Each plate dipped puts a little loose dirt into the bath, to be returned to you in an hour or two as a crop of spots on the negatives. Don't try to work through with collodion that is a little too thin; in a few days' time the prints will be either weak or hard. Be sure the varnish is just right. If it is too thin, the negatives are not sufficiently protected; if too thick it won't take the lead pencil well. Too thick and too thin in collodions and varnish are very much to be avoided. Again, the paste was not just right, and half the prints are peeled, or got lumps under them. Maybe the mounting table was not dusted, and a lot of dirt had stuck to the mounts, or the burnisher has been neglected, and at the very last operation they are oiled, soiled, spoiled. Begin to rectify at the beginning of the disorder. Recognize the first symptoms, and doctor, filter, boil, clean, dust, adjust, renovate, make new. A failure at the least point is the undoing of all. All this has been said over and over again, and still the boys have to be taught to be faithful, the girls to be neat.

What crops of dirt they will raise in corners where the employer's eye does not often penetrate; things dropped, things slopped, things scratched, things soiled, things neglected, things forgotten, things lost. This is the normal state of the gallery under the assistant's reign. Who would aspire to fine work must begin to inculcate the need of care, patience, and thoroughness in all, from the sweep up; and it takes all this just to make the photograph neat and clean, chemically and mechanically. To obtain great excellence, artistic qualities, one must go far beyond all this. Tast and fancy, qualities that cannot be taught, must have their play in each operation, and subordinate all else to themselves. But begin at the beginning, look after the little things first; till they are mastered, all other labour is but thrown away.

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* Read before the Manchester Photographic Society.

* *Practical Photographer.*

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THE CRYSTAL-IVORYTYPE.

A PRACTICAL PROCESS.*

This style of picture differs from the former photo-ivorytype, in that the print is first transferred upon the convex glass and the colours applied upon the back, whereas the photo-ivorytype is artistically coloured upon the face of the print and then transferred in a like manner upon the convex glass.

The effects produced are similar. The crystal-ivorytype or chromo-photograph has the advantage of ease in manipulation, and does not require the touch of an experienced colourist. When carefully made they present an attractive picture, and are popular wherever introduced. The following are the practical directions for making the chromo-photographs.

The print is made on albumen paper, and should be a shade darker than for general finsh. Cut it a trifle smaller than the glass on which it is to be mounted; having prepared the trangacanth paste, coat the face of the print and concave surface of the glass with it, using a brush. Lay the print on the glass, being careful to remove air-bubbles and excess of paste with the fingers, working from the centre, after which place several thicknesses of heavy paper on the print, and work it quickly down with the mounting tool, taking care not to break the glass. When thoroughly dry, it is ready for the transparent process.

Place the cake of transparent compound in a tin tray, setting the latter in a vessel containing hot water; put this on the fire, and when the compound is melted, immerse the glass-mounted print, which must remain until the picture becomes transparent. Remove from the tray, and, when cold, scale off the compound with the fingers, brushing all remaining particles carefully away with a small bristle brush. The compound can be remelted for future use. The colours may now be applied directly on the print, to the eyes, lips, jewellery, lace work, or parts which require no blending.

Paste narrow strips of cardboard to the concave edge on top, bottom, and sides; then lay another glass the same size, with the convex surface toward the concave side of the first. On the clear glass paint hair, complexion, drapery, and background. The colours may be removed wholly or in part with a little megilp applied with a soft cloth. The colouring finished, back up with cardboard. The picture is completed by binding the edges and back together with the gum paper, previously cut in narrow strips for the purpose.

Directions for Colouring.

EYES.

Blue—Ultramarine blue with a little ivory black.

Brown—Vandyke brown.

Grey—Ultramarine blue, Vandyke brown, and silver white.

HAIR.

Blonde—Chrome yellow, burnt sienna.

Brown—Vandyke brown.

Black—Ivory black, silver white, Naples yellow, ivory black, ultramarine blue.

FLESH.

Vermilion, silver white, and Naples yellow; for children use carmine in place of vermilion; for dark complexion deepen with Vandyke brown.

For backgrounds use your own judgment in selecting colour.

To Prepare Tragacanth Paste.

Take a tin cup and cover with hot water such quantity of the gum as you desire to make into paste; let it simmer for a few minutes, add boiling water, stirring continually, thin (if necessary) with boiling water.

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PHOTOGRAPHS IN GLACE FINISH.

A PRACTICAL PROCESS.*

The object in calling this a practical process for making the glace picture is as follows:

First, how to make the picture a success.

Second, how to make it with dispatch.

Third, how to save the gelatine, a matter of considerable importance.

Processes for making this popular style of pictures have been published in journals and books, but none explain the most essential of the practical points. The enamelling part of the picture is by no means the end of the work, and therefore the information for mounting will be of importance. Now to a point of much value, which we give from practical test; it is for the keeping of the gelatine from spoiling, and at the same time have it prepared ready for use in a few minutes.

Proceed as follows:—Melt one ounce of gelatine in eight ounces water, in a stone or porcelain lined pot, place the same over steam, and it will take but a few minutes to melt; when melted, pour the same in a glass, bottle and cork it. It is then ready for use at any time. When wanted for use, set the bottle containing the gelatine in a vessel of hot water; it will dissolve in a few minutes. Then strain the gelatine through a cotton cloth into an eight by ten porcelain dish, and when about lukewarm, it is ready for use. After the pictures have been passed through the gelatine, pour it back into the bottle, and it will keep in this way for a long time.

Formula for making the Glace Picture.

First. See that the glass is thoroughly clean.

Second. Gum the face of the glass one-eighth of an inch from the edge; albumen or gum-arabic will answer.

Third. Coat the glass with collodion on the gum side; let it stand about one hour before putting on the print.

Fourth. Before placing on the print, warm the glass to about blood heat (this is done to drive off the dampness).

Fifth. Place the prints in the gelatine, face up, for about five minutes.

Sixth. Take prints from the gelatine and place the same on the collodionized side of glass, face down, take a piece of thin glass 2½ inches wide, round the edge, and with this press the gelatine from the print. Be careful not to press too hard, the object being to remove the gelatine to a smooth surface; then stand them up for about ten minutes and they will be ready for backing.

Keep handy a cup of hot water to set the glass scraper in, which will keep it free from gelatine.

Seventh. Have the gelatine nearly hot, and apply the backing paper upon the print in the same manner, and see that it is well rubbed down, or it will not stick, and have the appearance of being blistered.

Eighth. The enamelling being finished, stand them up, face side towards the wall, and each separate; let remain over night, then take a knife and rule and cut inside of the gum and through the collodion, and a beautiful glace photograph will peal off from the glass.

Collodion is made of—

Ether ... ... 10 ounces
Alcohol ... . 10 ,,
Gun cotton ... ... 120 grains.

Materials required, are French gelatine, plate glass, backing papers, and cameo presses.

Two cabinets can be mounted on an 8 by 10 glass, and two cards on a 5½ by 7½ glass.

For mounting, put the picture in the press and emboss it, and to avoid the concave from flattening in a short time,

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The Photographic Rays o Light.

emboss a ferrotype plate of the same size, and cut out the raised part and place it between the picture and the card for mounting; this will keep the raised cameo in place nicely.

Instead of using a glass pattern for cutting the pictures to the desired sizes, it is best to have a thick paper, or wood form with the shape of the medallion cut out; this has two advantages: first, it prevents the surface of the picture from being scratched; second, it insures an equal and correct margin around the medallion. They can also be used for pressing the pictures to the mount, as it leaves no mark on the enamel.

Mount the picture by applying a little gelatine or mucilage on the back (say ¼ inch from the edge), place on the mount, then place the die on the picture, and put under a weight for several hours. This completes the picture, and with these practical instructions followed, nice work will be the sure reward.

Note.—It is observed that no mention is made of a No. 2 gelatine, as in the manner of keeping the solution it is not required.

By warming the gelatine to about hot when putting on the backing, the same solution answers for both. Always strain the gelatine before using.

A YEAR'S SUNSHINE.

We learn from a daily contemporary that the Registrar-General has lately extended the field of his observations, and, apart from his all-important duty of informing the public as to the state of its health, he now adds to his meteorological observations by publishing weekly, under the superintendence of the authorities at the Royal Observatory, Greenwich, an authentic account as to the number of hours that we have been favoured with sunshine in London. Campbell's Registering Sun Dial is used at the Royal Observatory for the purpose of recording these facts. It consists of a sphere of glass, four inches in diameter, supported concentrically, within a hemispherical bowl, in such a manner that the image of the sun, formed when the sun shines, falls always on the concave surface of the bowl. On this concave surface is laid a strip of cardboard, held in position by suitable clamping-pieces, on which the image of the sun is received; and, whenever the sun shines brightly, the cardboard becomes either discoloured, or blackened, or altogether burnt through. The position of the meridian is marked on the card before removing it from the bowl, and time scales of different lengths having been prepared, that one suitable for the particular day is employed to mark the scale of hours on the record. The following are some of the facts recorded by this ingenious machine, and which the Registrar-General alludes to in his weekly report. In the twelve months that ended on the 10th February last the sun has been above the horizon for 4454·0 hours—that is to say, this is the extreme limit of possible sunshine. But it appears that, at Greenwich, which fairly represents London for all practical purposes, the amount of sunshine was only equal to 1286·1 hours; so that, after disregarding fractions, it appears that in the year we have only been favoured with 29 per cent. of the sunshine we are entitled to, according to astronomers. From the 11th February, 1877, to the 10th instant, there was no sunshine at all in the following proportions:—January 14 days, February 14, March 8, April 6, May 3, June, July, and August 1 each, September 4, October 6, November 7, and December 16. These were the extremely dull days, without a glimmer of sunshine, but repeated instances occur of a few minutes' appearance, which, however, have been duly noted. In January the percentage of possible sunshine was 13·5, in February 14·4, in March 27·0, in April 17·3, in May 30·5, in June 53·9, in July 35·6, in August 35·4, in September 28·1, in October 30·7, in November 21·6, and in December 11·1. So very scarce are the moments of glorious sunshine in London. In January the sunshine lasted for 35 hours out of a possible 259; in February, the proportion was 40 out of 278; in March, 99 out of 367; in April, 72 out of 415; in May, 147 out of 482; in June, 267 out of 495; in July, 177 out of 497; in August, 159 out of 449; in September, 106 out of 377; in October, 101 out of 329; in November, 57 out of 264; and in December the sun only shone for 27 hours out of a possible 243. These facts are set out in the following table:—

Month.	Hours of Registered Sunshine.	Hours of Sun above the Horizon.	Percentage of possible Sunshine.	Days when there was no Sunshine.
January ...	35	259	13·5	14
February ...	40	278	14·4	14
March ...	99	367	27·0	8
April ...	72	415	17·3	6
May ...	147	482	30·5	3
June ...	267	495	53·9	1
July ...	177	497	35·6	1
August ...	159	449	35·4	1
September...	106	377	28·1	4
October ...	101	329	30·7	6
November ...	57	264	21·6	7
December ...	27	243	11·1	16
Total ...	1287	4465	28·8	81

PHOTO-SURFACE PRINTING.

There are two methods of producing the type plate from the negative, viz., the swelled gelatine, and the dissolved gelatine processes. In the former process, a thick film of bichromatized gelatine is spread on a sheet of glass, and upon this a sun picture of the negative is made, as in ordinary photographic printing. Wherever the light strikes, which in this case is upon the writing, the gelatine becomes insoluble. The gelatine film is then moistened with cold water, which causes the soluble portions between the lines to swell up and leave the writing sunken. A plaster cast is taken from this, when the writing will appear in a raised line upon the plaster. This cast is then pressed into wax; the wax impression is dusted over with plumbago to give it a metallic conducting surface, and is then placed in a galvanic bath, remaining there from one to three hours, producing an electrotype plate from which the printing is done. It is found, however, that the lines of the plaster cast are not high enough to make a good type, and before pressing the cast into the wax, the spaces between the lines are routed out, or dug out, with a tool to any required depth. Another method of accomplishing the same result is first to take the wax impression, the workman afterward building up the spaces on the wax, before putting it into the galvanic bath. Still another way is to take a plaster cast from the one already made, which will reverse it, the lines appearing sunken, and from this last cast to make a stereotype plate in type metal, and rout out the spaces in the plate itself from which the printing is done.

The dissolved gelatine, or photo-electrotype, process is somewhat more simple, and is the reverse of the one just described. The film of gelatine is made very much thicker than before. A light sun picture is taken, leaving sharp outlines. The surface is moistened, and the gelatine washed out, slightly deepening the spaces between the lines. The film or plate of gelatine is then dried, and these depressions are filled with an opaque paste, and the plate is again exposed to the full glare of the sun, by which the chemical effect of the light upon the lines is intensified and deepened, so that the gelatine is hardened to a considerable depth and a gradually increasing breadth, making a firm foundation for the type. The plate is again washed, and the spaces deepened to any extent desired. It is then dried, and can be printed from directly, as a type plate, or electrotyped as before described.

The negative can also be used in connection with the zinc etching process, by which the writing is transferred to a zinc plate, and the spaces between the lines eaten out by acids.—*Journal of the Franklin Society.*

HINTS FOR THE OPERATING ROOM.

BY A. M. DE SILVA.*

A CLEAN plate is a necessity. A solution of albumen, to which a large dose of ammonia has been added after it has been made some time, has a tendency to give "sandy" films. In summer, a few drops of C. P. nitric acid added to the albumen has a beneficial effect, preventing the too rapid development of the picture. But the plates should be kept very carefully from dust, because the albumenous coating coagulated with nitric acid, for a very long time remains "tacky," and everything adheres to it.

Collodion should never be used until it is sparkling bright. Samples of collodions found too "horny" will give the finest results if mixed with a cotton made at a high temperature, using four and a-half to five grains to the ounce of solvents, and iodide of ammonium, four and a-half grains; cadmium bromide, two to two and a-half grains. The way to make collodion is, first, measure out the alcohol, add to it the bromide, which should be dissolved before adding the iodide, which is next added and dissolved; then put in the cotton; after it is thoroughly wetted, very gently add the ether, shaking it up frequently, otherwise the salts will be partly precipitated by it.

It is no saving to leave the dregs in the bottle used for making collodion in; it oftentimes leads only to confusion. Frequently undissolved salts are to be found there, which renders it impossible to make two samples alike. When adding to the collodion in the pouring bottle, it should be vigorously shaken, in order to thoroughly mix the two samples. "Chain lightning" and other markings will be avoided. I am strongly opposed to puffs and puffery, but merit should be accorded where it is due; and I would advise every one who does not use a Cross collodion pouring bottle to immediately purchase one, for it will be of immeasurable advantage to them in aiding to secure clean films, the surplus collodion being strained after it is returned from the plate previous to its application to others, besides being an admirable pouring bottle, and not at all clumsy.

The Bath.—Not only does the bath become contaminated by the ether and alcohol and the salts from the films; dirty fingers help to make it sick, too. If fingers are not clean, when the plate is handled to coat and wipe off from the edge the collodion, the dirt—perhaps it is iron, nay, it might be even hypo.—sticks to the plate, while the dipper gets a share also. Down it goes into the bath. Then baths should be covered to keep out the "dust;" the dippers taken out at night and washed clean; in the morning the oxidized scum carefully taken off with a clean piece of filter paper, used with clean hands—and not churned into the bath, for it don't mix, it only remains there to be gradually fished out by each successive plate until it is all withdrawn. It is very unorthodox, but in practice I have found it an advantage to insert the plate in the bath at right angles to the position it will occupy in the plate holder, avoiding streaks to a certain extent.

Exposure.—Expose for detail always. A subject including extremes—for instance, a figure in a light dress—requires a long exposure and short development; otherwise the lights would be filled up before the darker parts appear.

Developer and Developing.—Sometimes it will happen that the films lack body, and it will be found that the addition of the acetic acid to the iron developer immediately preceding development will give a better printing colour. It is advisable to have a strong developer—say, sixty grains to the ounce—handy, which, if applied immediately after the ordinary one, will often save a plate. The strong developer should contain nearly the same amount (certainly not more) of acetic acid to the ounce as the ordinary developer, in order that it mixes readily with it on the plate. If it is slow in coming up, blow on the shadows, taking care to bring back the developer quickly on those parts; then pour off the developer, and, holding the plate level, in a few seconds—even a minute—you will see how nicely it is coming out. A plate under-timed should be kept pretty still during development; to a fully or over-timed one, more movement should be given. If a plate is under-timed, and feats of juggling are attempted, no wonder it will be hard, for microscopic hillocks are formed of silver thereby. The use of a very strong developer requires additional bromide in the collodion.

Fixing.—Cyanide will give the sharpest printing negative; but hypo is the safest, and should be used fresh and strong, otherwise there will be a lack of printing power—a decided unevenness—in the films, besides a liability to innumerable small black specks of sulphide of silver on the picture.

It is most important that the films should receive a very thorough washing after fixing, particularly if cyanide be used; not only are the films liable to be ruined by stains, if intensification be resorted to, but to split and peel off the glass.

Sulphide of potassium is an admirable strengthener. Bichloride of platinum gives a magnificent colour to the film; the bichloride of palladium certainly is the finest of them all, giving great delicacy and transparency and vigour at the same time. But it is imperative that a very tough, while at the same time sufficiently porous, sample of collodion be used, otherwise it will be covered with tiny reticulations, which will ruin it.

ON THE PRACTICAL EMPLOYMENT OF DIFFERENT BROMINE SALTS FOR EMULSIONS.

BY DR. J. M. EDER.*

THE chief requirement which bromides used for emulsions must fulfil is that their composition shall be constant. When in this condition the amount of bromine contained in the salt is accurately known, which is of great importance for determining the correct relation of the bromine to the silver. A precaution much recommended in the use of the crystallised cadmium-bromide is to dry it and weigh it when quite free from water, because by exposure it takes up water, so that the amount of bromine in the cadmium-bromide, calculated according to the formula, does not agree with that which is rarely contained in it. So, too, ammonium-bromide attracts a varying amount of water from the air, and should, therefore, be dried before weighing.

The double bromide of ammonium and cadmium, which was first fully described by me, can now be obtained commercially, and is much used for bromide emulsions. In its crystallized and dry condition it has a constant composition; it neither takes up water, nor does it give off any by exposure. Drying it is quite unnecessary, and, indeed, ought specially to be avoided, for I have proved that the double salt, at a temperature of 150° C., loses a portion of its ammonium-bromide, and has then an unreliable composition which will be the cause of failure. The salt must be dried in the water oven at a temperature not exceeding 100° C., and never (as has been proposed) over an even, though slow, fire. Overheating the bromide of ammonium and cadmium is, therefore, not only unnecessary, but may be positively injurious.

For these reasons I recommend the dry and crystallised salt as an excellent bromide in the preparation of emulsions.

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* *Anthony's Photographic Bulletin.*

* *Photograpische Archiv.*

The Photographic News.

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PHOTOGRAPHIC TERMINOLOGY.

The communications of our esteemed correspondent, Herr Düby, describing the experiments of his compatriot, Herr Honikel, with a white pigment printing process, raises a question of some interest to photographers which has not hitherto received sufficient attention—we refer to the technical terminology of the art. Speaking in the familiar fashion common amongst photographers, Herr Düby used the term "white carbon" tissue. Of course, the veriest tyro need not to be told that carbon, as usually known, is not white. Many carbonates, it is true, are white, and the purest form of carbon, the diamond, is white; but the carbon used in photography (when it is used at all) is black lampblack, in many cases, and Indian ink, which is a preparation of vegetable charcoal, in others. One of the earliest English specifications of a carbon process, invented and patented by a Frenchman, describes the material to be mixed with the gelatine as "powdered coal," such being the translator's rendering of *charbon poudre*. In the earliest experiments in permanent printing, carbon was thought of as one of the most permanent substances, and the basis of the ink in which printed books and engravings were produced. Hence the term carbon process became adopted as descriptive of a mode of printing in which carbon need not necessarily play any part, as any permanent pigment would answer equally as well, and, indeed, so far as producing an image was concerned, any pigment, permanent or fugacious, might be employed. Pigment printing is, indeed, clearly a better term; but the term carbon printing will, there is little doubt, continue to be familiarly employed, as indicating the mode of working in producing the image, rather than the material of which the picture is formed. Our old friend, Mr. Bovey, last week put in a momentary plea for accuracy in terminology when contemplating the startling anomaly of "white" carbon. Our esteemed correspondent, Herr Düby, at once admits the practical solecism involved, which had amused him as he wrote down the words; but he points out that no other English phrase generally used in photography would have expressed the same thing. Herr Düby is well acquainted with the English language, and writes it with exceptional accuracy, and here used the phrase in question in order to follow the English fashion of saying carbon tissue in place of pigment tissue, which would be a better and more accurate term.

As we have remarked, there are many terms employed in photography which are clumsy and inexpressive. The word *negative*, one of the most important in connection with the art, is awkward, inaccurative, and undescriptive. In the one sense in which it is supposed to be descriptive, that is in being dark where in the picture it should be light, it is by no means always accurate, inasmuch as in many cases a negative also presents an image with true relation of tint and gradation—presents, in fact, what we equally erroneously term a *positive*. The clumsiness of the latter term is rendered worse by its ambiguity: created originally, it is clear, as antithetical to negative, it was at first applied to the print produced from a negative, and also, with the addition of the word *collodion*, to an image produced in the camera, in which the deposit of silver produced the lights instead of the shadows of the picture. Thus a print from a negative was a positive on paper, and a camera image on collodion was a collodion positive. Then comes another claimant for the term, namely, the collodion transparency, which is the accurate reversed counterpart of the negative, and hence the most legitimate claimant for the term. Next amongst the terms involving inaccuracy and confusion is the term *enamel*. To what in photography does it properly belong? To the print finished with a surface of gelatine and collodion? Or to the ceramic image burnt-in by the aid of the furnace? The word enamel has, it is true, meanings just as various in the English language as it has in photography. In its original and accurate signification it refers to work in vitreous colours—work produced in *amel*. But work produced in vitreous pigments, and then submitted to the fusing process of the furnace, presents a singularly smooth, delicate surface, and hence the term enamel is used popularly to describe anything possessing the peculiar softness and gloss of surface which distinguishes the ceramic painting. And the term is regarded as especially applicable to any form of polish which is impasted, or laid on to the surface in a body. Hence, papers or cards which are coated with metallic pigments and polished are called enamelled papers, or cards. The renowned, or notorious, Madame Rachel, who has recently again attracted the attention of the minister of justice, is said to enamel her patrons by applying a coating of some pigment capable of receiving a suitably smooth finish! So when a coating of gelatine and collodion is applied to give polish to a photograph, the picture is said to be enamelled. Our French brethren are happier in their terminology here. Retaining the accurate term *email* for the burnt-in vitreous picture, they apply the word glacé to designate the other. We might multiply examples of confusing and clumsy terminology in connection with our art if any purpose could be served by so doing. Unfortunately, we have no authoritative academy to which to appeal for decisions in such cases. We cannot help thinking, however, if a representative national society were to take such matters in hand it might perform good service. A permanent scholastic committee might sit in connection with the society to consider fitness and philological propriety in the new terms required from time to time in connection with a new art and science. Their dicta would be generally adopted without question, and we should secure, not only fitting terms, but uniformity and precision in their use.

Another branch of the same subject might require the attention of the same committee; but, failing such a committee, photographers themselves have the matter very much under their own control, and may, if they choose, very much tend to repress a bad habit which is gradually gaining ground, and extending to the public as well as to photographers. We refer to the practice of using mean and debasing contractions of words. Against the first we shall mention, we offer at the outset our strongest protest. We refer to the contraction "photo." This is made to perform a double duty, and is detestably bad in both cases. Photographers themselves are content to style themselves and each other, each as a "photo!" whilst the public more frequently refer to a photograph as a "photo." We may be too fastidious and too much disposed to be a purist in this matter; but we must confess that our gorge rises when we hear a photographer complacently call himself a "photo!"

And our toleration for the term as used to indicate a photographic picture is not much greater. A "neg." is another contemptible abbreviation, not very common, we hope; but in occasional use, we know. Hypo has become so common, it can scarcely be got rid of, especially as the full word is long. But there is little gained by any of these abbreviations, and some of them are unquestionably unpleasant and debasing. Many photopraphers complain of the status accorded to the art in society. The use of mean sounds and abbreviations will certainly tend to lower the status in the general feeling of the public mind. We would urge upon all photographers, respecting their art and respecting themselves, to give such dignity to their profession as may be found in the use of precise and unmutilated phraseology.

CHARACTER.

BY W. HEIGHWAY.

The most important lesson the photographer has to learn is to preserve in his picture the character of the sitter.

You may not admire it—perhaps you might improve upon it—a hundred chances to one you may deem yourself quite clever enough to do that! Well, if you would only try, and fail—*and know it*—what a blessing it would be, for then you might condescend to be content with Nature's work.

Get the character first, and hold it to the last. You'll get it in the first pose if you are capable of getting it at all, unless you trust to flukes.

Recognize the great truth that Character is Beauty!

Keep this well in mind! It is the definite individual character of an object which constitutes its beauty; it may not satisfy your idea of the beautiful—but then your taste might be accounted abominable by the next man that comes along.

Be a little modest—it's an amiable and rather agreeable weakness—and give Nature credit for understanding just a little what she was about when she built up that nose a little of out the perpendicular, and that mouth with an unpleasant (?) depression on one side.

Take almost any well painted portrait; you admire it hugely. What a beautiful face! What animation! What grace! and so on. If you were to see the face from which it was painted, it is far from unlikely you'd say it was ugly—that is, you cannot appreciate the characteristics of that face, nor read the soul shining through. *The artist did*, and his canvas speaks what he saw. It is your fault if you cannot recognize its truth. I doubt much if the artist has any brains to spare *you*.

Beauty is that little something which fills the whole world. It is not Venus among women, nor the Alps in the mountain way; it is neither contained in a straight nose, a bow-shaped mouth, nor a sweeping eye-lash, but is universal. One man may shriek with delight over an acorn, whilst another cannot see anything to admire in Nature but a mountain range. To expect others to blindly accept your own definition of the beautiful is as ridiculous as to ask all your friennds to acknowledge your wife to be the most beautiful of women, and quarrel with them because they prefer their own.

Your favourite dish may not suit the taste of all humanity—for some it may be too highly flavoured, other some may deem it very stupid indeed.

Nature itself is never insipid, never monotonous; infinite variety, universal perfection, marks her work. Be content with her standard—it is no mean one! Go right straight ahead, and get the character of your sitter—then you may make it as fascinating as you like.

Don't deny your impressions—you may be turning angels away from your door.

Don't look for the unnatural balance of features one sees in a fashion plate. Nature's symmetry is of another order. The two sides of the face are never alike. This irregularity is in some faces very evident; in all, however regular the eyes may appear, however straight the line of the nose, and "perfect" the mouth, a little close observation will discover that *there is a difference*.

The photographer should learn to recognize this deviation from "perfect drawing," and take advantage of it in his pose.

These divergences from strict uniformity are by no means blemishes, being in reality the means whereby Nature secures such marvellous variety of form and likeness. The great painters have invariably taken advantage of and recorded them on their canvasses. It is your duty to do the same in your work. Don't run away from the most cruelly irregular set of features ever put together, but think out the problem how to set them before the camera to the best advantage, and record them honestly and fearlessly.

You will soon find you have no cause to be ashamed of Nature; rather will you find your admiration increases the more your eye is educated in the subject of the "defects of the human face."

(I don't know, after all, whether, when people fall in love, it is not with some defect rather than a perfection—else all the married folk would be the handsome ones of the earth. I may be wrong, but I don't think they are, as a rule!)

But, then, photography is not marriage.

How can I tell you in what character—pictorially speaking—consists? It may be a turn of the head, a smile, a glance of the eye, an arching of the brows, or a sweet pensiveness of expression; whatever it may be, find it out, and seize upon it. Then you please yourself in having made a PORTRAIT. I think the sitter and the sitter's friends will be pleased. I think they will—well, if they're not, it is their fault, not yours.

I have said that the two sides of the face differ—that there is a good side and a bad side, a good and a better, or, a bad and worse, as you like. I think it only honest to take the better view; or, at any rate, the result is more satisfactory—unless the demands of truth lie heavily on the other side. I am strongly of opinion they won't!

Ask yourself seriously what is the realization of the face before you. Don't meander and wobble round about the question, and grow from indecision to despair; but watch each turn of the head and every expression of the face, pleasantly, smilingly, to induce a good expression of likeness.

Don't bore your sitter with your anxiety, if you have any, but put forward all your best conversational powers, trying to make your victim feel thoroughly comfortable.

A sitter must feel no scruples about having his picture taken. The sort of feeling a man has when he knows he has a hollow tooth, and, whatever the pain he has to undergo, it must be stopped, is *not* the kind of sentiment he ought to have in your studio; and it is part of your duty to banish such a feeling, if it exist.

You don't want to picture "DREAD! OR THE DISMAL SITTER."

Study the whole face, not pieces of it, for then you look out the worst pieces. You are almost sure to try to find out just what Nature never intended you to see. Don't study an eye or a nose (and perhaps the worst specimen of either you think you have ever seen), and then fit the other parts of the face down to that low level. If you can't grasp an entirety, look out the best feature, *and work up to that.*

You can make just as many mistakes with your *unerring* camera as a bad painter may with his brush—perhaps more.

We are trained from childhood to criticise (or to be ungenerous). We are always trying to find out the worn seam and the patched elbow in our neighbour's coat. It's a mean way of looking at mankind. Don't give way to it more than you can help.

On the other hand, don't do things to suit people—they will hate you for trying to satisfy their meanness, and you won't suit them after all.

LIGHT AND SIGHT.

BY W. T. BOVEY.

PART I.—LIGHT.

WITH his usual liberality and anxious desire to encourage communications on matters that in the abstract or in a positive degree deal with photography, our esteemed friend the Editor has honoured me with an invitation to publish the results of my observations in connection with the diagnostics of sight.

In the onset, and as a prefatory remark, I wish it to be clearly understood that I repudiate all claim to infallibility. Humbly, patiently, and studiously, I have groped my way along a difficult and dimly-lit path, and although I feel obliged to differ, in many respects, from the teachings of accepted authorities, I have not imbibed that amount of confidence which makes men supremely dogmatic.

Light and sight are so intimately related, that it is impossible to touch on the one without making some reference to the other; hence the necessity that compels me to treat somewhat briefly on light before entering on the subject of seeing. *What is light?* I purpose responding to this interrogation with a short statement of my views respecting the solar ray, and its attendant phenomena. As regards the sun, I have, at the present time, no intention of interfering with his pyrotechnic displays, his hydrogen prominences, or metallic vapours. My thoughts at this moment leaning earthwards, I prefer to dwell on the manner by which Sol's rays operate as they pass through a terrestrial atmosphere to nourish the earth. More than two thousand years ago Pythagoras made an intellectually inspired guess that light was an emission of numberless and impalpable particles from the surfaces of all substances, these emissions, on entering the eyes of animals and human beings, producing the sensation of vision. That the Grecian sage made a good guess at some part of the truth it will soon be my business to show.

From the latter part of the seventeenth century, systematic and scientific investigations of light must be dated, and to Sir Isaac Newton is due the honour of first subjecting solar rays to the test of analysis. Concerning the constituents of light, Newton expressed an idea that solar light consists of molecules of imponderable matter projected from the sun with inconceivable velocity. So many reasons might be adduced to show that Newton, in this matter, was clearly in error, that it is only on the assumption that he was intent on discovering ways and means for bringing to pass the great and final conflagration that an excuse can be found to condone the mistake. Sol's necessity causing an occasional absorption of a planet, has provided material for theologians, who sometimes overlook the ludicrous in their zeal to prove that the Bible is true, as if Holy Writ required a battery of logic to protect it from the assault of progression. Huyghens propounded a theory both comprehensive and practical. Light created by the solar rays, acting on an infinitely elastic ether, universally diffused; penetrating matter, spread over space. Disturbed by solar influences, this ether, with inconceivable velocity and wave-like motion, impinges on matter, rebounds in continuous undulations, which, entering the eye, produces the sensation of sight. We shall presently observe that Huyghen's has a mass of good evidence to back him.

Returning to Newton, and his interesting analysis of light, every photographer is, or should be, familiar with the optical law which enables us at will to resolve a ray of light into prismatic colours, hence I need say nothing concerning refraction. Newton's deduction, obtained from his study of the spectrum, although long regarded as correct, is now, in most cases, discarded in favour of the teachings of Brewster, this eminent experimentalist having proved almost conclusively that the seven colours, as seen in the spectrum, are the result of admixture; that the true spectrum consists of three colours only, viz., red, blue, and yellow. Whilst occupied in studying the evidence presented by the two eminent philosophers just named, a simple test occurred to my mind, which, applied, decides the question in favour of Brewster. I procured pieces of stained glass, red, yellow, and blue. Asunder, each was transparent; joined in pairs, objects seen through them were clearly visible; combined as a trio, the glasses were nearly opaque. On reflection, I concluded that the passage of a darkened red was due to the yellow glass being flashed in some degree an orange. Substituting a green glass for the yellow, the combination was as opaque as a board. If light was an admixture of seven distinct colours, results as I have described would not have occurred.

At this point I am compelled to enter on novel and delicate ground, inasmuch as my experiment having shown that solar light is composed of three colours. I quit that safe assumption, and state my belief that tri-coloured light is consequential; in reality, Sol's true rays are yellow, if they have any colour at all. Notwithstanding that it is apparent to our senses that their divisions into colours exhibit diversity of wave lengths, varying in their refractive capacity. On a previous occasion I gave, in the pages of the NEWS, an outline of my views with reference to the origin of light. I might now observe that time and thought have strengthened my convictions that the solar rays are uncombined in their powers and character, until they operate on the magnetic ether, when mutual repulsion causes violent agitation. An undulatory motion is set up where the vibration is most acute, on the inside; heat is generated (the red ray), and where the vibrations slacken, actinism commences (the violet ray). Apparently, red, yellow, and blue combine to make the light white; in reality, they are antagonistic, and keep separate, although the division is too slight to be observed without the aid of a prism. The difference of wave lengths observable in the spectra colours are, I believe, due to the efforts they make to fly from each other. I deem it probable that to the natural antagonism which exists between the yellow and violet rays is due the fact that yellow glass stops the chemical ray, and thus prevents its interference with "dark room" operations. Yellow flowers, such as the dandelion, buttercup, and sun-flower, strain their petals backwards when exposed to the rays of the sun. And it is a wonderful adaptation, designed by Nature, that flowers, as a rule, are yellow at their centres in some degree, which arrangement enables the heat ray to operate freely in maturing the seed.

The light rays, as they impinge on objects, do so wave-like, swelling and declining at intervals. Long observation convinces me that the actinic rays operate in regular undulations, the intervals being clearly perceptible. The heat rays observe a similar law, as is shown by the intermittent heat produced by a lens kept at a steady focus in the direct rays of a bright summer sun.

The greater the intensity of heat given off by the sun, the smaller the amount of actinic force generated. Some attribute this fact to prevailing mists, and the excuse is plausible, but I cannot receive it as natural. Temperature has much to do with the production of actinic force, which is most abundantly perceptible when the thermometer stands from 55° to 60° Fah. We have good reason for supposing that solar heat is the result of developed electricity, that actinism is an intermediate stage of magnetic development; the cause we might safely speculate upon, but its exact nature is beyond our "ken."

A few words concerning "Fräunhofer's dark lines" conclude the first part of my subject. A careful consideration of the remarks I have advanced on the wave-like motions of light will reasonably show the causes of the intervals, or dark lines, observable when a ray of light, passed through a narrow slit, is resolved into a chromatic spectra. The coincidences noticed to exist between the dark lines in the solar spectra, and the bright lines seen in the spectra of candescent metals, will, probably, be regarded in time as purely accidental. Philosophers have not yet lost their desire to dazzle and mystify. Nature never ceases to expose the simplicity of her handiwork. Much might be added to account for phenomena that is perceptible in the working of Sol's rays. I hope, however, shortly to write a paper that will be confined to remarks on the subject of actinism.

PHOTOGRAPHERS' TRIALS.

BY T. COAM.

I oft think photographers should be fully blessed with that very rare qualification, a sweet temper. I know no other profession that taxes temper and patience more than photography, especially the out-door work, in which difficulties increase tenfold if by chance you go to some uncivilised part of the country to take a group or view, and cannot conveniently erect your tent in an out-of-the-way corner, but are obliged to be content with some place where you are not directly in the way of everybody, as some people are not backward in upsetting the lot if you do not keep your eyes open. While at work in your tent your exterior appearance is a subject of great interest to the young rustics, who swarm around like so many bees. Their conversation at times is not very pleasant to hear. One "wonders what he is doing," another "supposes he's trying a new scarecrow machine;" another bacon-eater thinks it's a "peep-show concern, and he's getting the fakement ready." The fourth rustic, being of a more inquisitive turn of mind, intends having a peep on the cheap, and pushes his nose against the yellow glass. This little trick immediately envelopes the poor operator in darkness (this is a trying ordeal for the temper, especially if he has just flown the plate with developer); but he darts away. So the gang, in their hurry to get from the savage photographer, upset his camera. When he raises his three-legged, glass-eyed monster, and finds its frontispiece broken in, what is he to do then? Only one thing—pack up and go home.

It was a similar accident to this urged me on to look out for a something with which I could stop a hole to enable me to get the picture. I now take with me a stick of Prout's elastic glue (to be had at any leather-seller's, at a penny the stick). Make the blade of your pocket-knife hot over a spirit-lamp, and melt a small portion of the glue into the crevice. It dries very quickly, and is as hard as the wood itself. Anything can be joined with this glue—baths, dippers, carriers—in fact, it is very useful both in studio and field. We are unable to carry a double supply of everything, because of the weight; and, as we are all open to accidents, however careful we may be, the above little hints may be useful to some of "ours," and save them a deal of trouble.

THE USES OF FRENCH CHALK.

BY T. BOLAS.

A correspondent in the News for February 8th writes:—"I see French chalk in cleaning plates is said to obviate the necessity of a substratum for the film. Surely this is rubbish."

Seeing this I inly smiled, and thinking that the next number of the News would surely contain a communication from some user of French chalk, I kept silence; but as no one came forward, I now enumerate some of the uses of this truly remarkable substance.

The collodion or emulsion worker who well rubs his plate with French chalk after cleaning it, may take extraordinary liberties with his film during the washing. While the water from the tap is running on the plate, he may clean off the edges of the film with his finger, or he may draw patterns on it with a pin. After the plate is French-chalked it generally looks rather smeary, but no harm will happen on this account. The plate should not be breathed on after French-chalking.

When the negative which has been taken on the French-chalked plate is dry, it can be removed from the glass with the greatest ease, if it is desired to obtain a reversed negative for collotype or a similar process. Those who intensify their negatives by the mercuric chloride process will especially benefit by using French chalk.

A Frenchman trims prints or cuts out small pieces of paper on a sheet of cardboard, and, by rubbing this with French chalk, he converts it into a kind of turn-table, on which the paper will slide or move easily. In this way much time is saved.

How many people who try the asphaltum process for photo-engraving have ended by cementing portions of the film to the asphalted plate! The remedy is to French-chalk both surfaces before putting into the printing-frame. Similarly in carbon or Woodburytype printing, rub French chalk on the tissue and negative if there is the least suspicion of dampness or stickiness. When india-rubber goods are sticky, use the same remedy. Negatives recently adorned with black varnish are improved by a dusting with French chalk; or similarly, negatives varnished with any varnish which tends to be sticky should be French-chalked. If the photo-zincographer is a discreet man, he will keep a little box of French chalk near his press, and give the plate a dusting with it before putting down his transfer; while the machine-printer will do well to remember that a very small quantity of French chalk will help the paper over rubbing surfaces in a remarkable manner.

ON THE PROPERTY WHICH CHRYSOIDIN HAS OF PREVENTING THE PASSAGE OF THE CHEMICAL RAYS.

BY DR. J. M. EDER AND CAPTAIN VON TOTH.[*]

A description of the interesting behaviour of chrysoidin in permitting only chemically non-actinic light to pass has been going the round of all the photographic journals. To enable us to form an opinion on such statements we coloured a sheet of gelatine with chrysoidin, which had been prepared according to the formula given in the *Photographische Archiv*, 1877, p. 183. Strips of this sheet, and of red, yellow, and green glass, and also of combinations of these glasses, taken two together, were fitted into an otherwise opaque frame, and under it an emulsion plate of silver bromide was exposed to full daylight. Further, the above named strips were fixed in the tube of a lens, which was placed in combination with a portrait objective by means of a long opaque tube. On the emulsion plate placed in the photographic apparatus a diminished image of the strip of glass was obtained. In both cases dark lines were drawn upon the strips, to facilitate the comparison of the images when obtained. In both experiments the exposure was continued for six[†] hours, and the images developed by the alkaline method. It then appeared that the chrysoidin sheet had protected better than the yellow glass, and better than the green (coloured with iron oxide, and with copper oxide) glass, but it was perceptibly more transparent to actinic light than red glass. Yellow and green glass laid over each other protected better than a single chrysoidin sheet; but a double sheet allowed about as much light to pass as a dark red glass. After a three days' exposure, light penetrated a treble chrysoidin sheet equally well as a dark yellow or a double green glass, and produced a very perceptible image.

A treble combination, either of one yellow and two green glasses, or of one green and two yellow glasses alone, is impervious to the chemical rays of light. Work can be done with an emulsion plate in a dark room protected in this way without the slightest chance of fogging. Emulsion plates placed under a treble glass of this kind, and exposed to light, gave the least fog of all other combinations.

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[*] *Photographische Archiv.*

[†] To have as constant a light as possible, the exposure was always from nine to three o'clock.

A red and a yellow glass came very near in effect to the above mentioned treble glass, but the colour of the light in the dark room is unpleasant. Yellow plates of glass which have been covered on both sides with chrysoidin varnish are also good protectors.

The allegations as to the effectiveness of chrysoidin must, therefore, submit to some modification, in so far as the same results can be obtained by the use of properly coloured and adjusted glasses. There is, however, no doubt that chrysoidin affords an excellent means of fitting up a dark room quickly. The yellow panes of the ordinary dark rooms are mostly lighter and less effective than the dark yellow glass which we employed, and in such a case the chrysoidin varnish is much to be recommended.

As to the permanence of chrysoidin—whether it fades or bleaches in light—we are not yet in a position to make any communication.

◆

A GOOD SURFACE FOR RETOUCHING UPON.

BY W. H. TIPTON.*

Recently I noticed advertised in one or more of the journals a preparation for applying to the surface of negatives, for facilitating retouching, by supplying the proper tooth. The compound was advertised at the moderate (?) price of two dollars per bottle. For the benefit of those using a varnish requiring an application of this kind, an investment of a dime will supply sufficient of the following to last for months, and I believe it to be equal to any preparation for the purpose:

Rosin	½ ounce
Turpentine	2 ounces

Shake well until dissolved.

For the face of an ordinary bust or vignette card negative, apply about half a drop of the mixture with the cork of the bottle, and rub over the face and other parts to be worked, with a piece of cotton flannel; continue rubbing until it is apparently all removed, and an excellent surface for the pencil will be the result.

The following varnish (see "Mosaics," 1875, page 41) has a fine surface for retouching, without any preparation, if the negative is worked within a few weeks after being varnished:

Gum sandarac	12 ounces
White turpentine	12 „
Alcohol, 95 per cent.	1 gallon

These proportions are admirable for negatives or ferrotypes. For negatives not to be pencilled for some weeks after varnishing, the gum turpentine may be slightly in excess of the sandarac, and *vice versa* for ferrotypes, when necessary that they should harden quickly. Great care should be taken, however, not to get the sandarac too greatly in excess of turpentine, as it is a gum that cracks very readily if subjected to moisture or change of temperature. It can only withstand the test of time when softer gums or essential oils have been generously used with it.

◆

Correspondence.

WHITE PIGMENT PRINTING.

Sir,—In the News of the 15th your German Correspondent writes to say that Mr. Honikel, of Leipsig, has just discovered an improvement that is likely to produce the greatest revolution in carbon printing.

Now this identical improvement—or, at least, the very same theory—was propounded to me by my friend, Mr. Walter Davey, a practical and clever photographer in this town, nearly two years ago; and a few months later I saw him working out the theory into practice, but with results, certainly not as your correspondent describes, "crowned with success." That is to say, the prints had not the same fine definition nor gradation of tone as by the ordinary carbon printing; this because he could not obtain the proper white pigment for this special purpose, and, being a professor of music, besides a photographer, his limited time would not allow him to work out his theory to his satisfaction.

Any way, his method was this:—He produced a white carbon tissue, exposed under a positive, and developed on black paper. He testifies to the wonderful rapidity of the printing, not from the extra sensitiveness of the tissue, but from the fact of printing under a positive instead of a negative. Unlike the ordinary carbon tissue, the image is visible *before* development, and the printing can be seen in progress.

I write this, not from any idea of taking from Mr. Honikel the merit due to him for the discovery, but that I may testify to the fact that Mr. Davey had also been working out these new ideas, and because he is too modest to step forward and say so.—Yours obediently, Thos. Donovan.

St. James's Studio, Brighton.

WITHOUT ACKNOWLEDGMENT.

Sir,—Though perhaps I ought to have felt flattered, yet I must say I felt just the reverse when I read in the News of last week the extracts from a paper by J. L. Gihon, which appeared in the *Philadelphia Photographer*. Except the two first paragraphs, the whole of the extract is a verbatim piracy from my work "Instruction in Photography," commencing at the first line of the first chapter. This must have escaped notice, I am sure, or you would not have countenanced the insertion of the article. I am aware that there is no copyright in connection with America, but I had supposed that even a pirated edition would have borne the name of the author. Mr. Gihon, however, seems to think that even this slight advantage to myself should be dispensed with, and wishes to father the authorship on himself. This is not an English way of showing honesty.

What the relations are between Mr. Gihon and Mr. Wilson (the Editor of the journal in question) I am not aware, but I would suggest to the latter that it might, perhaps, be more pecuniarily profitable to him if he reprinted the book, without the expense of MS. from Mr. Gihon.—I am, sir, yours faithfully, W. de W. Abney.

[We need scarcely say that we regret exceedingly that Captain Abney's work should have been thus used without acknowledgment, the more so as we have always regarded Mr. Gihon as a respectable writer. Perhaps it is unnecessary to add, on behalf of the Editor of our American contemporary and ourselves, that it is scarcely possible to be familiar with not only all the facts of photography, but of all that has been said on the subject by many excellent writers.—Ed.]

WHITE CARBON ONCE MORE.

Sir,—In reply to Mr. Bovey's remarks respecting my communication in your issue of the 15th ult., I beg to observe that I was really puzzled as to the term for Mr. Honikel's paper. It is not unacquaintance with the English language—though I freely confess that often, in my correspondence, I mutilate the Queen's English—but the difference between the two languages with regard to the words "carbon tissue." In German, we seldom speak of *kohlepapier* (carbon tissue), but generally of *pigmentpapier*.

Now, since I never found in any English journal any other expression than *carbon tissue,* I had no other word for *weisses pigmentpapier* than *white carbon tissue*; and, indeed, though heartily laughing when I wrote it down, I was cautious enough to write it with other characters, such as to indicate clearly the *contradictio in adjecto*. However, the case might be an occasion to show that it would be better to substitute a more general expression for the good old word, carbon tissue.—Yours, &c., Ernest Duby.

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* *Philadelphia Photographer.*

ALCOHOL IN THE BICHROMATE BATH.

Sir,—An article under the above heading, by John A. Spencer, will be found in the Year-Book of Photography for 1878 at page 49.

Experiments made by Mr. Spencer deserve to attract the attention of students to whom all that relates to carbon printing is of interest. Practical and theoretical knowledge must ensure for him a special hearing. Mr. Spencer found that the addition of pure alcohol to the bichromate bath yielded very unsatisfactory results, inasmuch that it rendered the bichromate solution useless in a very short time. He multiplied his experiments to the same effect.

We are not told that the drying of tissue so prepared was materially accelerated, neither are we informed as to the quality of prints obtained from tissue sensitized with this alcoholic mixture; but I gather from the concluding sentence that the writer's object and purposes were fully answered when he had arrived at the knowledge he described. He has rendered a service to others who might be induced to repeat the same experiments. Mr. Spencer has proved that the suggestion so readily made may read very well in theory, but is utterly worthless in practice.

Mr. Spencer's example has induced me to supplement and probably complete his experiments, and a few words will suffice to give the result of my experiments under similar circumstances. After carefully preparing the sensitizing solution, I prepared several pieces of tissue. I cannot say that I observed any very important difference in the time of drying. I felt more anxious about the results, and it may surprise many to learn that, after printing, this tissue was found almost insoluble. From day to day the alcoholic bichromate bath presented a darker appearance, and I cared very little to enquire into the composition or demerits of a worthless solution, comforting myself with the thought of returning to the simple bath which had hitherto done good service.

Theory based on reliable practical results is always most welcome to all, but the instance in question furnishes me with an opportunity of re-asserting the truth of a statement made by me some time ago, and to which exception was taken by those who had sufficient evidence before them of the respect in which I hold sound theories. What practical photographers object to is the being misled by persons who are regardless of the trouble and mystification they cause to others who may be enthusiastic enough in the practice of their art to act upon their suggestions.

When M. Leon Lambert gave his instructions for carbon printing, he said: "The bichromate bath is good to the end; add fresh solution to it as you go on, and you will find things work all right." These were the words of a practical man, and they turned out absolutely true. The rich tones of the first chromotypes sent to the Autotype Company were obtained with an old bichromate bath.

On his way to America M. Lambert gave me a call, and observing a frame filled with matt-surfaced chromotypes, he pronounced them the perfection of chromotype printing. This frame was presented to him, and it is to be hoped that it was of some service to him in his American campaign, which has proved so fruitful. In conclusion, it may be said that the best results are always arrived at by the simplest means. It is very seldom that obedience to the good old saying, "Leave well alone," engenders repentance.

Payne Jennings says, very truly, that it is not a mixture of such or such a collodion that you must put in your landscapes, but "soul;" and Adam-Salomon says it is not the fiddle a man plays upon, but the way in which he plays. So it is with lenses. C. Ferranti.

Proceedings of Societies.

Manchester Photographic Society.

The monthly meeting of this Society was held at the Memorial Hall on Thursday evening, the 14th ult., Mr. Alfred Brothers, F.R.A.S., President, in the chair.

After the routine business had been transacted, Mr. W. Watts and Mr. William Banks were elected members.

Mr. W. J. Chadwick then read a paper, contributed by Mr. Woodbury, on "The Modern Magic Lantern" (see page 98), and exhibited the pyro light alluded to in the paper. He (Mr. Chadwick) also exhibited one of Mr. Fletcher's air and gas apparatus. Mr. Chadwick also explained how the sciopticon was adapted for use with the limelight, showed his improvement on Mr. Woodbury's lime-holder, and concluded by presenting the Society with an oxyhydrogen burner for the sciopticon, for which the thanks of the Society were voted to him.

A member exhibited a portrait which was said to have been taken by the Vanderweyde artificial light. The portrait was a very good one.

Mr. Noton showed his swing-lens mount in its completed state.

Mr. Coventry exhibited an ingenious pocket-camera and stand designed and made by himself.

Mr. J. W. Leigh showed a transparency on a collodio-albumen plate, developed with ferrous-oxalate dissolved in a solution of potassium oxalate. The colour of the deposit was not considered suitable for transparencies, although an excellent one for negatives. He (Mr. Leigh) said the developer, when first applied, became black, owing to the plate having been treated with gallic acid.

Mr. D. Young came prepared to exhibit another improved gas retort, also a perfected Keevil's lantern; but time would not admit of these being shown.

The members, and several gentlemen of the Liverpool Amateur Photographic Association who were present on a return visit, then adjourned to another room, and did ample justice to an excellent knife-and-fork tea.

The President then congratulated the company on being favoured with the presence of their Liverpool friends, which was suitably responded to by Mr. W. H. Wilson, on behalf of himself and his companions.

After the wet and dry processes had been satisfactorily worked up in the refectory, the company adjourned to the large hall to witness a lantern exhibition, conducted by Messrs. W. J. Chadwick and N. Wright. The apparatus used were two sciopticons with the limelight arrangement, the oxygen being produced during the time of exhibition by Mr. Chadwick's generator and gas-holder. The pictures shown (including a fair proportion by members of the Society) were very choice, and the gas apparatus did its work excellently.

The walls of the meeting-room were adorned with a number of capital pictures by Messrs. Coote, Leigh, Sanderson, and other members; and, after a most enjoyable evening, the meeting was adjourned.

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Talk in the Studio.

Carbon Printing for the Trade.—Most of our readers are familiar with the name of Mr. Witcomb as one of the successful exponents of carbon printing, and many have been indebted to his excellent hints. His announcement in our advertisement columns this week, to the effect that he now undertakes carbon printing for the trade—or, rather, for licencees—will be read with great satisfaction by many who may not yet have become successful in carbon practice, or who may, from limited time or appliances, be unable to execute their work well in their own establishments. We may add, for the information of those who may not have seen Mr. Witcomb's work, that its quality stands amongst the very highest of the Lambertype mode of working.

South London Photographic Society.—At the next meeting of this Society, which will take place on Thursday, March 7th, in the rooms of the Society of Arts, Adelphi, Mr. Wratten will go through the development of one of Wratten and Wainwright's emulsion plates.

A Curious Fire.—A few days ago, in one of the most careful households in this city, where fenders guard the fireplaces and safety matches aggravate the strange visitor, smoke was discovered in a room adjoining the one where the family were at breakfast. Investigation showed that a chair in the room was burning. How it could have taken fire was a mystery until it was noticed that the sun's rays, falling on a large magnifying lens used to study photographs with, had been concentrated through it upon the chair, and had set it burning. If the family had not fortunately selected for breakfasting an hour when the sun is pretty near the zenith, and so prudently fixed it to have some one in the room at that dangerous time, the whole house might have been mysteriously destroyed.—*Hartford Courant.*

Glue for Polished Steel.—The Turks glue diamonds and other jewels to their metal settings with a mixture made as follows:—Dissolve five or six bits of gum mastic, each the size of a large pea, in as much spirits of wine as will suffice to render it liquid. In another vessel dissolve in brandy as much isinglass, previously softened in water, as will make a two-ounce phial of strong glue, adding two small bits of gum ammoniac, which must be rubbed until dissolved. Then mix the whole with heat. Keep in a phial closely stopped. When it is to be used set the phial in boiling water. This cement perfectly resists moisture, and it is said to be able to unite effectively two surfaces of polished steel.

Quick Camera Printing.—Photographs for subsequent painting on in oil may be prepared by floating the prepared and sensitized surfaces with a pyrogallic and acetic acid developer before exposure. The operator is thus enabled to see his pictures coming out, and stop them at the right stage for fixing. This has been attended with the most satisfactory results. It is only necessary to have a lighted candle in the room, stationed behind the canvas, and, covering up the mouth of the camera, approach it occasionally to note progress. Life-sized pictures, or thereabouts, from quarter-plate negatives, require about thirty seconds to print suitably.—*Scientific American.*

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To Correspondents.

A Ten Years' Reader.—Sulphuric acid will dissolve oxide of chromium; but we do not know of anything which will dissolve it which will not injure artists' colours. Many of the colours are metallic salts, and will be affected by the same solvents as oxide of chromium. The term artist colours is too indefinite in a chemical sense, as their several constitutions vary so widely. Colours mixed with a varnish, then dried and reground up, would not be effectually protected from injurious influences, as in grinding the colours the protecting varnish which enveloped the particles would be wholly or partially removed. Mr. Solomon supplies the powder and other materials for the dusting-on process of carbon printing. Your question about dextrine is indefinite. You ask, "What will eliminate it from the plate?" What plate do you mean?

Negative.—Your letter is forwarded to our private residence, where we do our editorial work, whilst the box of negatives is not before us, being, doubtless, retained at our office until we call to see all arrangements for the paper going satisfactorily to press; when there, we shall have brief time for examination and comment. But we think that we can see your difficulty and its cause before we see the negatives. You speak of being able to obtain a good negative of a bust, but woolly, over-exposed looking negatives only of a full-length figure. We remember well, many years ago, being sorely perplexed with a similar difficulty. Persevering examination of the facts, however, soon revealed the cause of the trouble. Using the same lens for producing the bust and the smaller full-length figure, we had to increase the distance between sitter and camera considerably for the latter, and by doing this we interposed a long space of illuminated atmosphere between the sitter and the lens, which veiled the image, which appeared in the negative flat and wanting in relief and contrast. The body of thick atmosphere reflecting light, and the number of objects reflecting light into the lens, when lenses of long focus are used, rendering a long distance between lens and sitter necessary, are often very troublesome. Screening the lens well from all light except that coming from the sitter is useful, but nothing but choosing a very clear day, or using a lens of shorter focus, will at times entirely get rid of the difficulty. After examining your negatives we see no reason for modifying our remarks. The portrait is badly lighted, there is too much diffused front light; the light wants concentration, and there is, as we feared, a body of illuminated atmosphere between sitter and lens. But all the negatives are a little over-exposed, or otherwise diffused light enters the camera through the lens. Keep your developer weak, and use plenty of acid.

W. Chambey.—So far as the studio is concerned, the plan of which you send, we should think it would do very well. We do not understand the architects' objection as to lack of light and ventilation in the rooms beneath. However, it is their business, and we presume they will have reason.

J. R. (Nottingham).—It is not probable that you will be able to obtain chrysoidin of local chemists; but most photographic chemists in town will be able to supply it. Apply to your stock house, and they will doubtless get it for you, if it is not kept in stock.

J. Watkins.—To use permanganate of potash as an intensifier, make a solution twenty grains to an ounce of water, and, after fixing and washing the negative, immerse it in the permanganate solution. As a rule, however, it is better to rely upon a solution of silver and iron or pyrogallic acid. 2. It is better to use hydrochloric acid than salt, for precipitating the silver from washing waters. The silver is thrown down as a white chloride, but if there is much water and little silver it is generally a long time in precipitating.

R. M. G.—For copying, a portrait lens, well stopped down, will answer well. A good light, ripe collodion, and an iron developer, with a full share of acid.

Payne Jennings.—Thanks. In our next.

Several Correspondents in our next.

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METEOROLOGICAL REPORT FOR JANUARY.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven,
36 *feet above sea-level.*

Date.	Barometric Pressure. Morning	Barometric Pressure. Noon.	Barometric Pressure. Night.	Temperature in the Shade. Morning	Temperature in the Shade. Noon.	Temperature in the Shade. Night.	Remarks.
1	30 02	—	29·50	41°	44°	46 5	Rain p.m.
2	30·14	30·17	30·11	36	44	45	Rain at night. Gloomy all day
3	29·91	—	29 74	45	—	48	Rain a.m. and p.m.
4	29·84	29·93	30·02	49	51	46	Fair and sunny.
5	29·92	29·90	29 85	46	46	47·5	Rain all day
6	29·72	29 68	29·52	46	47	42·5	Showers of hail and rain, with wind, this evening
7	29·23	29·28	29·53	42	44	39	Showers of rain a.m. and p.m.
8	29·82	29·94	30 08	36	42	38	Rain showers a.m. and p.m.
9	30·17	—	30·17	32	38	30	Fair and sunny
10	30·20	30·20	30·50	27	38	28	Fair and sunny
11	30·38	30·40	30 40	28	40	38	Fair, but cloudy
12	30 38	29·34	30 28	38	43	45	Fair, but cloudy
13	30·18	30·19	30·07	42	46	45·5	Fair, but gloomy
14	29·99	—	30 00	48	—	49	Drizzling rain a.m. and p.m.
15	30 01	30·02	30·04	48	50	—	Fair, but damp and gloomy
16	29 94	30·02	30·12	46	50	45	A little small rain this evening
17	30 22	30 25	30·28	45	—	45	Fair, but cloudy
18	30·30	30 30	30 28	45	47	45	Drizzling rain a.m. and p.m.
19	30·25	30·20	30·00	44	—	45	Drizzling rain a.m. and p.m. Heavy rain at night
20	30 00	29·96	29·72	44	—	50	A little drizzling rain p.m.
21	29·55	29·59	29·49	47	50	51	Rain a.m. and p.m.
22	29 63	—	29·43	34	45	46	Rain p.m.
23	29·40	29·25	29·26	41	51	38.5	Rain a.m. and p.m. Very strong wind
24	29 27	29·27	29 25	39	39	37·5	Sleet at night. Wind
25	29·27	30·35	29·56	31	32	39	Sleet this morning. Cold N. wind
26	29·80	29·80	29·87	34	35	39	Fair and sunny
27	29·75	29·60	29·56	38	39	39	Rain all day. Sleet a.m.
28	29 48	29·56	29·69	40	41	39	Showers of hail and rain a.m. and p.m.
29	29·90	29·98	30·00	34	45	31	Fair and sunny
30	30·11	30·16	33·21	28·5	38	34·5	Fair and sunny
31	30·08	—	30 48	30	—	29	Fair and sunny

Summary.	Mornings.	Noons.	Nights
Highest temperature observed	49°	... 51°	... 51°
Lowest ditto	27	... 32	... 28
Mean ditto	39 5	... 43·4	... 41.4

Mean of all observations ... ... 41°·4

The highest barometric pressure observed during the month was 30·4 inches on the 11th, and the lowest was 29·25 on the 24th.

Days on which rain fell	19
Fair days	12
Fair days bright...	7
Fair days gloomy	5

The rain amountsd to 2·37 inches, and the evaporation to 0·88 of an inch.

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PHOTOGRAPHS REGISTERED.

Mr. Franklin, Deal,
Photograph of Wrecks on Kingsdown Beach.
Photograph of Wreck of the *Gustave.*
Mr. Gobbi, Westminster Bridge Road,
Photograph of Oval Border.
Mr. Hoggard, Redcar,
Photograph of J. W. Swan.

The Photographic News, March 8, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Ins and Outs of Pigment Printing.

The chemistry of carbon printing is as much involved as that of the collodion image. Just as it is impossible to tell with any degree of certainty what it is that happens to the sensitive silver plate when exposed to the light, and renders it capable of revealing an image by subsequent treatment with a reducing agent, so we are unable to assert what actually takes place when a mixture of a colloid substance and a sensitive chromium salt is subject to the influence of light rays. An insoluble chromate is formed, and that is about all we know. Students of photography usually begin by asking for an explanation on this point and on the other, in the hope of receiving a speedy and satisfactory answer; and they are puzzled at the outset of their training by some complicated or incomprehensible exposition which leaves them more in the dark than before. When steamers were a novelty on the Thames, and it was a treat for Cockneys to make the trip to Greenwich or Gravesend, in the good old times of "The Tuggs' at Ramsgate," the question used to be put very frequently by the enquiring school-boy, "What is steam, father?" Notwithstanding the parent's attempts to evade the question, and his apparent unconsciousness of his offspring's proximity, the thirst for knowledge had to be satisfied in the end, for the London youth has a knack of tugging at his father's coat-tails in case he does not receive due attention, and, in the end, the explanation usually was that "You see, my boy, they pour in cold water first of all, and then light up the fire and make it very hot, and the engines, they work about and stir it up a good deal, and the stokers heap on the coal down there in the furnaces, until everything is glowing, and breaks out into a perspiration, and the paddle-wheels go round and carry the boat along until it gets to Greenwich, or wherever you want to go—that's steam." Not a very lucid explanation, perhaps, but quite as satisfactory, nevertheless, as those sometimes offered by photographers to their pupils. The former think that they ought to be acquainted with the action of light upon iodide of silver and a bichromate mixture, and a sudden readiness on their part to oblige with an explanation of the why and wherefore of the process brings about a rigmarole quite as absurd as the definition of steam we have just quoted. When, about two or three years ago, carbon printing received a great impetus, and was employed, for a short time, by a great many photographers, we were constantly being informed of the most simple means of overcoming great difficulties. By adding, for instance, a few drops of alkali, or acid, to the developing water, the development of the image, we were told, could be controlled with the greatest nicety, while under-printed or over-exposed tissues might be set straight in an instant by adopting some other simple precaution. These thousand-and-one remedies have long ago been forgotten, and the proposers thereof have doubtless by this time gone back to silver printing once more. It is surprising, indeed, how few of the so-called improvements in carbon printing have stood the test of time. The addition of alcohol to the sensitizing bath is one of these exceptions, and is recommended by many practical carbon printers who employ it daily. The well-known firm of Braun, of Dornach, which has probably more experience in carbon printing than any other, believes in the addition of twenty per cent. of alcohol to the bichromate bath, and many carbon printers in England, to our knowledge, use about the same quantity. The alcohol takes the place of so much water, and hence the tissue, when hung up to dry, becomes sooner fit for use, since the alcohol is so ready to evaporate. Moreover, the spirit seems to make the tissue tougher and less liable to crack or break. In summer, too, the alcohol has another advantage: it seems to make the gelatine mass more firm, and it has no tendency to run, a phenomenon with which all carbon printers who sensitize only with an aqueous bath are well acquainted when there is nothing but a hot room wherein to dry the tissue. The sensitized tissue, when alcohol is employed, may sometimes be used half-an-hour after its treatment with bichromate solution. The Abbe Laborde, whose name as an early and patient worker in photography is a household word, tells us that if, instead of dipping the tissue in the bath, the bath is sparingly poured over the surface of the tissue, but a very short time need elapse before the prepared tissue is put into the printing frame. He not only uses the bichromate solution in small quantities, but he, too, employs alcohol, using, indeed, he says, as much as fifty per cent. of that liquid. We do not know what carbon printers in this country would say to such a large addition of spirit, but the Abbe says it saves time, and frequently, if not always, "Time is money." While on the subject of the Abbe's notes, we may mention that he has faith in chromate of zinc as a sensitizer, and says that, added to bichromate of ammonia, it should render good service to photographers. The temperature of the developing water is a matter of the greatest importance when one has to do with the bichromates of ammonia or potash, whereas gelatine sensitized with chromate of zinc will permit of an image being developed in boiling water. He recommends the addition of a proportion of this salt, therefore, to the sensitizing bath, say two decigrammes for every gramme of bichromate of ammonia. The question of transfer paper is another subject in which an improvement might be made. No doubt the largest demands will always be for white transfer papers, but as these are apt to turn yellow by time, it is likely that pigment printers will, where possible, employ a tinted paper which may be relied upon to remain permanent, and assist at the same time in the effect of the photograph. Sketches or water-colour drawings are rarely met with upon a pure white paper, and consequently, when the photographer has a picture of some art pretensions to print, he will not be at all averse to choosing a neutral or other tinted background whereon to place his carbon image. If the tint of the latter contrasted or harmonized well with the transfer paper, very charming effects might be produced by the juxtaposition of the two tones. Certainly the time is not far distant when the carbon printer will expect to have at his disposal a series of transfer papers to select from in carrying on his work. Light shades of pearl-grey, neutral green, buff, and drab would prove very suitable at times for landscapes and large portrait work. One other point is worth mentioning while on the subject of pigment printing. In order to secure even and uniformly sensitive tissue, it is necessary that the chemicals employed should be uniformly good and pure. We take some trouble to get our salts of gold and silver of good quality, and photographers, as a rule, only employ nitrate of silver that has been recrystallized once or twice in their dipping baths. But it is questionable whether they pay the same attention to the purity of the bichromates of ammonia and potash which are used in pigment printing. These salts are cheaper than the others, and are less likely, therefore, to command attention. And yet the equal working of the sensitizing bath vitally depends upon the purity of the bichromates or mono-chromates dissolved therein. The Dornach firm will never use any other but recrystallized salts, for the commercial salts nearly all of them contain free chromic acid and chrome alum, both of which have a most injurious effect upon the whole process. Pigment printers cannot hope for success unless they can depend upon the purity of the chromium salts they employ.

CARDBOARD SLIDES FOR GELATINE FILMS.

BY REV. H. J. PALMER, M.A.[*]

SINCE our last meeting I have employed my leisure in further efforts to diminish the weight and frangibility of the tourist's photographic *impedimenta*, and I have jotted down a few notes of the result attained, in the hope that they may prove of interest to our meeting to-night.

Which of us who has enjoyed the pleasures, or mourned over the discomforts, of photography in the field, has not at times discovered to his horror that the focussing glass has met with an accident, and can in no wise be replaced by impromptu ingenuity? This misfortune has befallen me on more occasions than one; and I am, therefore, in a position the better to appreciate the chance discovery of an efficient substitute for ground glass for the use of the tourist. No one would desire to supersede the ordinary focussing-screen in the studio; but something lighter and less breakable is clearly a desideratum for out-of-door work. The focussing slide before you was made by myself at the cost of about threepence, and it combines the qualities I have mentioned above. The following are the necessary directions for the production of a slide 9 by 7 inches:—

Soak fifty grains of gelatine in one ounce of water for a few minutes; add one drachm of fresh ox-gall and one drachm of skimmed milk. When dissolved by heat and thoroughly mixed, pass through the filter, and flow the solution over a clean and dry glass. Now place the glass upon a level stand, and pour the remainder of the gelatine upon it before the first coating has had time to set. As soon as it can be raised it should be placed in a current of air and allowed to dry where no dust can settle upon it. A piece of moderately-thick cardboard is next to be divided with rule and compass into (say) four sheets of the required size; and from each of these the centre is to be removed with a sharp knife, so as to leave a margin on all four sides of half or three-quarters of an inch in breadth. Three of these pieces are now to be super-imposed, closely glued together, and placed under a weight till dry. I have named three as the number of layers to be used; but this obviously depends upon the thickness of the board and the depth of the dark slide from the surface which touches the camera to that of the sensitive plate. As soon as the gelatine and cardboard are dry insert the point of a knife round the edges of the former, and strip it from the glass plate. It may now be trimmed with a pair of scissors to the required size, so as to overlap the edges of the aperture in the cardboard by about three-eighths of an inch. Allow it to lie flat upon the glass, and bring down upon it carefully the surface of the thicker cardboard frame, upon which some strong paste has been sparingly spread. The whole may now be raised, the remaining cardboard pasted upon the gelatine, the white surface bound neatly with leather or dark paper, and you have a focussing slide which will bear any reasonable amount of wear and tear, and which will weigh hardly as much as the glass of a slide of similar size.

In order to give additional strength to the whole it will be well to pierce each of the corners and insert a small brass paper binder with double points, before the final leather or paper covering has been employed. To prevent warping it is better to place a considerable weight upon the slide for some hours.

The cardboard dark slide I now produce has been prepared for use with my sensitive gelatine films, and is, as I have ascertained by frequent experiment, perfectly adapted for its purpose. The size of my wooden slides is 7½ by 5¼ inches, and, accordingly, for a single slide, I cut with a penknife a sheet of cardboard of these dimensions to form the bottom of the slide. I next prepare a number of strips three-eighths of an inch wide, a number also of one-quarter of an inch in width, one piece of the size of the bottom with an aperture 7 by 4¼ inches, and another piece to form the shutter 4½ inches wide by 8 inches.

The building-up of the slide was easily accomplished as follows:—Sheet No. 1 was placed on the table, and three-eight-inch strips glued upon three sides of its upper surface, the opening in the fourth side being designed for the insertion of the sensitive sheet. Upon these strips half-inch widths were fastened, and the vacant side of the first layer was bridged over with a half-inch strip of board. Next followed three sides covered with the three-eighth inch strips, the vacant end being left for the admission of the shutter. Lastly: over all I glued the piece containing the aperture; the shutter was cut from the cardboard and fitted into its place, the whole was covered and made neat with black paper and colour, a weight superimposed for the night, and in the morning I found myself possessed of a fairly-effective dark slide, of home make and of inappreciable cost. When the sensitive gelatine has been slipped into its place, I have a small piece of black card ready, which I insert from the inside in the opening through which the gelatine has been passed.

This dark slide was so easily made, and proved so efficient, that I set to work and made a double one of the same description, and also a double one for use with glass plates. The latter is not yet complete; but you will see that it has sufficient stability and strength to answer its purpose, and the method I have adopted for securing the sensitive plate in position without admitting light seems to me to be ample and satisfactory.

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STUDIO HINTS.

BY E. V. DAKE.[*]

To Clean Negative Glass.—Put them in a stone jar; fill it up with cold water, set it on the stove till it boils; when cool, wash up by laying them flat on a board, and using a common splint scrubbing brush.

To Prepare Albumen.—Take the whites of eight eggs, be sure and take out the germ; to this add twenty-four drops of glacial acetic acid, diluted with one ounce pure water. Stir well, leave it stand two hours, then strain through a piece of muslin, then add one drachm of ammonia, and you will have a stock solution that will keep for a year at least. For use, take one ounce of stock solution, and add thirty ounces pure water; filter through six thicknesses of muslin.

Instead of flowing the plates with albumen, I use what is called the mansard brush—make it yourself, as follows:—Take a piece of glass three inches wide, and six inches long; fold four thicknesses of Canton flannel over one end, and slip on a rubber ring to hold it in place; wash it thoroughly to free it from lint and dust, and set it in the dish containing the albumen (a glass goblet is a nice thing). After washing the plate, dip it into a pail of pure, warm, filtered water, let drain a moment, then draw your brush from top to bottom, and the work is done.

There is a great deal said about pinholes in negatives and their cause; one great hobby is an over-iodized bath; now, say you have two quarts of bath, forty-five grains strong, iodized to saturation. That bath will not give pinholes, if dust and foreign matter be kept out, unless you impoverish it or waste the bulk of it. I claim, that if you keep the same quantity of bath with the same strength of silver, you never will get pinholes from over-iodizing.

Retouching Varnish, for a soft pencil:

Alcohol	8 ounces
Gum sandarac	7 drachms
Venice turpentine	½ ounce
Camphor	1 drachm

Dry without heat—gives a soft tone to the negative, increases the intensity, and gives a tooth that will take hold of every touch.

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[*] Read before the Liverpool Amateur Photographic Association.

[*] *St. Louis Practical Photographer.*

If you want a varnish for a hard pencil, and want to do a very fine job, take

White lac ... ... 1½ pounds
Alcohol ... ... 1 gallon.

Dry the lac and pound it fine, add to the alcohol, keep warm till dissolved, then filter; should be as thick as you can flow without ridges. To prepare the varnished surface for retouching, take some powdered pumice-stone, sprinkle over the face, and with the ball of the second finger commence a circular motion and grind the surface till you have the desired tooth; in touching, if you get too much lead on some part, you can easily remove it with a piece of rubber by dipping it into the pumice stone and grinding that particular spot.

A Tray for Floating Paper and Toning.—Make a box four inches deep, nineteen by twenty-four inches inside, have the bottom in one piece, and put the bottom in the middle so you will have a double tray, one side for toning and the other for floating paper. To prepare it for use, take one pound of good beeswax and melt it; lay the tray on the stove and warm it well, then flow the wax all over the inside, let it cool, then flow again, then give an extra flow around the corners. I made one seven years ago; has never leaked a drop, and is clean and healthy to-day as you could wish. Washing trays can be made by using half-inch boards well nailed together the size you wish, and lined inside with white oilcloth, fitting it into the bottom, and tacking on the outside edge; very cheap, and will last for years.

Seven years ago, Mr. Newton gave a formula for cleaning prints from hypo in a very few minutes. In the "Mosaics" for 1877 he reiterates the statement, and I have often wondered whether photographers generally have availed themselves of this little dodge. I have used it ever since I first saw it, and have prints made every year for the past seven years, and whatever other faults may be found with them, they have never been troubled with hypo. I use the acetate of lead, two ounces, in sixteen ounces of water, which is a stock solution—two ounces of stock solution in one gallon of soft water forms the wash for prints. Pass the prints through three waters after fixing, then into the lead wash, keep them in it for ten minutes, then rinse three times, and your print will be perfectly clean; if the water turns milky when you add the lead, add a few drops of acetic acid, and stir just enough to make it clear.

I visited a gallery in a city larger than ours not long since, and found the printer trimming his prints, but they were all toned, fixed, washed, and dried. I don't know but what most printers do the same way, but they could not do it for me; times are too hard to squander time and money that way.

After printing, trim all your prints nicely to just the size you wish before toning; if you are an artist you will not tear one in ten thousand in the subsequent manipulations; by doing so you can save your clippings for the refiner, and won't need more than half the gold to do your toning.

When your prints are washed, lay them face down in a pack, press the water out of them, then paste the first one, take it by the corner and lay it on the card and rub down, and so with the next; in this way you will save silver, gold, time, and labour.

Corn starch makes a splendid clean paste. You can get just as good a gloss on your prints by rubbing them over with a piece of white Castile soap as you can to dissolve it in alcohol, and soak your prints up with that. Try it.

Have a rule to work by: don't guess so much, even if you are a Yankee; a handful of this and a cupful of that in a careless way may work well seven times out of ten, but may fail you the next three times, and cause you to lose your time, temper, money, and your customer.

Because there is a good margin in photography, it is no reason you should not practise economy. I have a friend who has been squinting through the camera for the last ten years, does good work, and always has a fair run of business, and yet he has not seemed to get along financially as he ought to. Of course there may be many reasons why, but when I visited his rooms this summer I found out some of them. When he develops a plate, he does it over the sink, and all the excess of silver goes out the waste pipe; washings from prints go into the sink, and consequently the silver goes out the waste pipe; makes new toning every time he tones a batch of prints, and when done with it throws it into the sink, and so the gold goes out the waste pipe; three-fourths of the money he spent for silver and gold was a dead loss; it went out the waste pipe, to return to him no more for ever. Try another way: develop over a stone pan, let the excess of developer and silver go into it, also the first water that covers the plate in washing; it will keep evaporating, so you can use it for a year before you clear it up, and send the contents to the refiner.

Save the first three waters from your prints in a cask or tub, and at each saving add common salt, and stir well. When full, let settle, then draw off the water to within three inches of the bottom by putting in a faucet, or even by boring a hole and fitting a plug to it nicely.

Wipe out your holder every time you use it with a cloth; when the cloth becomes foul throw it in with your clippings—catch every drop of silver solution on something; the bulk of your bath is composed of drops, and every drop contains money.

Keep up the price of your work; for mercy sake don't make people think you are only a half-made photographer by offering them work at half price; people are willing to pay a good price for good work.

Never force your work on your customers; if they are not suited with it, don't let them have it at any price; they will soon learn that you think as much of your reputation as an artist as you do of their money.

Keep your temper before your customers (now I know I am setting you a hard task), but it must be done, even after giving Miss Nancy four sittings, while others are waiting, and then she finds that one of her spit curls has not got just the exact curve she desires, and must sit again; let her sit, for you can plainly see and hear that she has a tongue (and I believe all women have), and that tongue had better wag in your favour than against you.

I think I promised to say something practical, and right here is a good place. When you become brimful of badness, and can't possibly contain yourself any longer, make a break for the dark-room, close the door tight, and then hate yourself for ever engaging in the beautiful art of photography; and if you must quote Scripture backwards, do it in a sepulchral whisper, but don't chew the bath dipper to pieces, nor munch up a dozen good negative glasses—that is not economy. You had better have a large rubber ring hung up, and when you must eat somebody, or something, lay hold of that and chew to your heart's content. When the paroxysm is over, you can come out as smiling as needs be, go to work like a hero, and conquer the difficulties that lie before you, and send Miss Nancy away declaring that "he is the most polite and pleasant artist I ever saw. Why, I sat nine times before I got a negative to suit me, and he didn't get mad once."

Finally, to be a perfect success in photography, you must be a gentleman, a scholar, a Christian, and an artist.

PERMANENT GELATINISED PAPER FOR TAKING ENAMELLED PHOTOGRAPHS.

BY FRITZ HAUGK.*

The popular enamelled (that is to say, embossed or cameo) portraits can be taken without trouble and with great rapidity by means of this paper, provided only ordinary care and attention be used. It has also the advantage of being very durable, so that a stock of it can be prepared, and used when required. The preparation of the paper is as follows:—Good albumenised paper (if possible, free from bubbles) is floated in the usual way on a ten per cent. silver bath. After it has lain on the bath for about two minutes, it is gently taken up, drained against the edge of the vessel, and allowed to dry between two pieces of blotting-paper; this must be done so as to produce on the albumenized paper a perfectly even and rather dull shining surface, when looked at sideways, without any bright marbling or streakiness. In this half-damp condition it must be placed (of course with the sensitive albumen film downwards) on the following bath:—

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* *Photographieches Wochen-Blatt.*

Water	400 c. c.
Gelatine	5 to 6 grammes
Common salt	5 „

and left to float—occasionally lifting it out and replacing it—until the gelatine solution adheres quite evenly to the film of albumen. When the paper has been dried at a moderate temperature it is ready for use.

As already stated, paper prepared in this way is very durable—probably as durable as washed silver paper. Besides this, it possesses the advantage of being extremely insensitive to light, so that without further treatment not even approximately good copies can be attained. Like washed paper, it must, therefore, directly before (or, still better, in the course of) the operation be fumed with ammonia. This is done, as is well known, by previously fuming the printing-frames (or, rather, pads). In other respects the permanent gelatinised paper should be treated in just the same way as the sensitised albumen-paper prepared in the usual manner; but care must be taken not to injure (or, what is still worse, to rub off) the film of gelatine during rinsing. It is, consequently, very advisable to keep portraits taken on this paper separate from all others, and to manipulate them apart.

The chemical solutions and the wash-waters employed in this process should be as cool as possible. Particular care must also be taken that the water to be used for washing be perfectly free from grease, for all fatty particles which may be present in the wash-water will inevitably attach themselves to the softened film of gelatine, and can scarcely be removed without injury to it. And since particles of fat in the gelatine solution would work the same mischief, this solution must be thoroughly purified.

The preparation of the gelatine solution may be dismissed in a few words. It is well known that gelatine is soluble in hot water only, and that in cooling the solution sets like a jelly. Impurities must be removed from the solution by passing it, while hot, through an old linen rag. More gelatine than is given in the formula should not be used, for with a larger quantity a thicker film is formed, which has the disadvantage of taking up water, and if thus swollen it is very liable to injury when the picture is washed. So also the quantity of salt used must not be increased, for in the presence of much salt only pale, weak copies will be obtained, even when the paper is well fumed; if anything, the amount of salt should be decreased. If the gelatine solution is to be again used, it must, after every time of using, be kept in the dark, as silver chloride dissolves in it.

In the further process, the same operations are followed as in the ordinary enamel process. Prints which do not require retouching can, immediately after the last rinsing, be placed on the collodionized glass plate. In collodionizing, I employ a two per cent. collodion, and lay the plate, after it has been properly drained, in a shallow pan of water, where it remains until the water runs off the plate without leaving streaks. With ordinary care the pictures adhere easily and without bubbles to the film of collodion; even should there be a few bubbles, there is no harm done, for they can be soon removed by pressure with an ordinary squeegee. When the picture is free from bubbles on the collodionized plate, it is pressed with the squeegee firmly on to it.

The picture must next be mounted. After it has dried somewhat on to the collodionized plate, which takes place in from five to ten minutes, I wet it with good fresh paste to which a small quantity of gelatine has been added, and place on it a sheet of double or treble cardboard; the latter must first have been softened for a short time in water, and well dried by a towel. After pressing down the cardboard on the picture by means of a paper knife, or of the wooden handle of the squeegee, I leave the whole to dry gradually for from six to twelve hours. So soon as the picture and cardboard are perfectly dry, the point of a knife inserted beneath one corner of the former will easily lift it off; it will often detach itself little by little of its own accord.

It need scarcely be said that the glass plates (plate glass is the best for this purpose) which are used in the enamel process must be thoroughly cleaned. Plates that cannot be trusted may, as in the coloured carbon process, be covered with a solution of resin or wax; or they may be rubbed over with oil of turpentine by means of a piece of filter paper, so as to leave a thin film on the glass. Afterwards the plates must be polished with talc and cotton-wool; and if this be properly done they will have a bluish lustre.

In conclusion, a few words on the treatment of those pictures which require retouching. Such pictures, it is needless to say, may not be taken directly from the last wash-water and laid on the collodionized plate; they must first necessarily be dried. This is best effected by sticking them with the back against an oil painted door; when partially dry they may fall off, and can then be thoroughly dried by spreading them on a table. No difficulty will be experienced in retouching, as the layer of gelatine takes indian ink well. Care should be taken that the indian ink is of precisely the same shade as the picture to be retouched; the latter must also be varnished with a thin solution of gelatine. When the retouching is completed, and the ink is quite dry, the pictures must again be laid in water for a few minutes. They can then be mounted as above described.

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WASHED FILMS.

BY THEO. BADEN.*

In November, 1869, I published in the *Photographische Archiv* an article in which I stated that silvered and washed albumenized paper will keep white a long time, and that when fumed with ammonia it will give good copies. The fact excited great attention at the time, but has not since been introduced into practice, although no one will deny the excellence of the process when properly carried out. I myself gave up at last the ammonia fuming, and replaced it by a second silver bath containing about five per cent. of nitrate, and this method gave, in every respect, very satisfactory results, with the exception of a few spoiled sheets at the commencement.

Many persons will regard it as a useless task to first wash off the silver nitrate, and then to renew it. But it must be remembered that, together with the silver, there is washed off the nitric acid salt which is formed every time the paper is sensitized, and which appears not only to be the cause of the rapid deterioration of the paper, but to affect also its sensitiveness and toning.

A short recapitulation of the process may not be out of place:—First, a silver bath of eight per cent.; floating, not longer than it suffices to convert the chloride into silver salt, the albumen into an albumenate. This requires from twenty-five to forty seconds, according to the kind of paper and the temperature. I work with the doubly albumenized paper, weighing ten kilogrammes, made by Hiffert, of Dresden, and silver for exactly thirty-five seconds. Should the paper roll up on the bath, it is too dry. After silvering it is washed, four or five times, in pure distilled water, laid between blotting-paper, and lastly, while still damp, placed on the second silver bath; in this a floating of twenty seconds will be enough. Where loss of a few pieces is of no consequence, it is more convenient to dry a second time between sheets of chemically pure filter-paper, though the very purity of the paper may show itself occasionally most annoyingly in spots of reduced silver. The paper, however, will improve with use.

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* *Photographisches Correspondence.*

I should also mention that I add about five per cent. of alcohol to the silver bath, and to the last wash-water before toning a little ammonia salt; also that I fix in a constantly fresh soda bath of about five per cent. Strange to say, I am seldom troubled with bubbles, and then only when the paper has been floated too long on the silver bath.

What has been stated of the operations with paper is applicable in all essential points to that with a negative. If it be desirable to maintain the sensitiveness of the silver bath as long as possible, it should be iodised at the time of preparing with an alcoholic solution of iodine, without any further acidulation; with the same bath also the same collodion should always be used, and the collodion (when made at home) should contain but one base, and thus contaminate the bath with only one kind of nitrate salt. Nearly all collodions contain the bromo-iodine combined with two, or sometimes with three, different bases. Only occasionally is a formula met with for a collodion containing only one base (*ex. gr.*, Vogel's bromo-iodide of cadmium collodion), though such a one is greatly to be preferred for general use, because it conveys only one nitrate salt to the bath, whose sensitiveness is thus longer maintained. Some photographers use any collodion which may happen to be at hand with the bath, or which may be best suited for a particular purpose, without thinking or knowing that with every fresh collodion they transfer to the bath a couple of new salts, or rather double salts, which are far from contributing to its increased sensitiveness. In order, however, with one collodion and one silver bath to obtain the greatest possible sensitiveness and clearness of the negative, washing out the nitrates is essential.

Supposing that carefully cleaned and polished glass plates, without a substratum of albumen, are used for the picture; the sensitized plate must be washed in pure distilled water to which about one per cent. of silver nitrate has been added, and which, in addition, has been exposed for some hours to the action of direct sunlight. The omission of this operation will lead to the blackening of the plates under the developer if the water should not have been perfectly pure. In washing it is best to use a roomy dipping bath, in which the plate, resting on the dipper, can be moved up and down and from side to side, until the water runs off quite smoothly. Then it is allowed to drain, and transferred to a third bath, which contains a five or six per cent. solution of the silver salt, saturated with pure silver iodide, and weakly acidulated with pure nitric acid. Sensitizing is best effected by leaving the first washed plate a longer time in the bath, and the acidulation may be produced by so-called pure nitric acid, from which any cloudiness occurring on the addition of silver nitrate has been first removed by precipitation. In this bath the plate must remain at least a minute. From a tolerably strong and fresh developer alcohol is best omitted; for acidulating it I prefer sulphuric acid to the organic glacial acetic acid (Vogel).

Rinsing wet negatives, to keep them as long as possible, before developing, is not a novelty. In the *Photographische Archiv* for 1869, p. 145, it will be found that Hughes, of Ryde, held this process in such high estimation that he employed it in the summer time for ordinary studio work. The chief advantages, however—increased sensitiveness and greater refinement of the negatives—were sacrificed, as, according to the above article, the plates had to be washed in distilled water purified, or rather, polluted, with potassium permanganate; and, finally, had to be brought back to the original bath, which was saturated with nitrates in order to supply them with the necessary free silver.

PHOTOGRAPHY ON PORCELAIN.

A Practical Process.*

Photographic miniatures upon porcelain are the most exquisite pictures produced by the art.

Detrimental to their popularity has been the uncertainty in their production, and the early fading of the prints when made with the collodio-chloride process.

From practical test, the following formula is recommended for obtaining, with uniform success, superior porcelain pictures, possessing strength, beauty of tone, and permanency.

Albumenizing the plate.—Dissolve three grains chloride of strontium in four drachms of water, and add to white of one egg, beat to a stiff froth, let settle, and filter through sponge. Clean the porcelain plate by laying in acid for several hours, wash thoroughly, and when dry, wipe with flannel dipped in alcohol, and rub dry with clean flannel; remove particles of dust with camel's-hair brush, and flow on the albumen cold, drying it in over-heat. Plates thus prepared can be kept any length of time, and are ready for use.

Sensitizing the plate.—Dissolve one ounce silver in twelve drachms of water (by grinding the silver in a glass mortar and adding the water). Take from this four drachms into a clean graduate or wide-mouth bottle, and add thereto, by drops, liquid of ammonia, which will brown the solution; continue adding until it is clear, then return to the eight drachms of plain silver, which will brown all the solution, add by drops the nitric acid C. P. until it is clear, then add the twelve drachms silver thus treated to twelve ounces 95 per cent. alcohol, stirring while adding; filter, and it is ready for use.

This solution will keep for any length of time, and when it requires replenishing, make new, and mix with old, filter, and it is ready for use.

When wanted for use, filter, pour into a clean bath-holder, warm the plate and dip into the bath, let remain therein two minutes for polished plates, and three minutes for those with a ground surface; remove from bath, let it drain, then flow with 95 per cent. alcohol, pouring on the corner sufficient to cover the plate. A repetition of this upon a different corner of the plate may be required before the plate presents an even surface; when the plate is drained, and dried by heat, it is fumed from five to ten minutes. Should a vapour appear after fuming, gently heat the plate, and it will disappear. Print a shade deeper than those on paper.

Toning the print.—When printed, place in acid water in proportion of half an ounce acetic acid to sixteen ounces water, let remain therein for several minutes or until the picture is changed to a uniform red tint, then wash in several changes of water or under a tap, and tone in a solution prepared the same as for paper prints; examine the progress of the toning by transmitted light; care must be taken not to overtone the print. When toned, wash, and place in the fixing solution, prepared of one ounce hyposulphate of soda dissolved in ten ounces water; fix from five to ten minutes, then wash under a running stream from ten to fifteen minutes; dry over a gentle heat.

For prints to be plain or tinted, plates with a polished surface are used; for fine artistic finish in colours, plates with a ground surface produce the desired results.

Photographic prints upon watch-dials can be made in the same manner. A few specimens made by this process, displayed in handsome velvet cases or frames, will result profitably to any establishment.

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* *The Photographic Rays of Light.*

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The Photographic News.

Vol. XXII. No. 1018. MARCH 8.—1878.

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EXPIRATION OF SWAN'S CARBON PATENT.

An announcement by the Autotype Company calls attention to a fact for the arrival of which many photographers have been for some time anxiously waiting. We refer to the lapse of Swan's carbon patent, the fourteen years for which protection is granted having expired a week ago. The first announcement of the process appeared in our pages on the 12th of February, 1864. The first results produced were, as we announced them at that time, the most perfect carbon prints we had ever seen, having all the delicacy of gradation of a silver print. Nevertheless, the process has made great advancement since that time, both in excellence of result and in facility of operation. And in the present day, after all the controversy which the process has evoked, few will deny that results as good as, or better than, silver may be produced by carbon printing, and that, with fair intelligence and care, carbon prints are as easily produced as silver prints.

The perfection which has been attained in process and result has been at the cost of much experiment and expenditure. In Mr. Swan's hands the process obtained an enormous amount of time, attention, and devotion from a gentleman of rare ability and power of concentration, who spared no effort and no cost in improving his darling invention. After some years the patent passed into the hands of a company, and more thousands of pounds than we care to mention were expended in making the process available for the general use of photographers. Then came Mr. Johnson's great discovery that the use of an adhesive substance for the temporary mounting for development might be dispensed with, and further patents for additional improvements have been from time to time secured, the majority of which are held by the present Autotype Company. The great fact of importance to photographers is, however, that the original process of Swan, as patented and published fourteen years ago, is now free to the public, and those "patent trammels" which have irked many photographers so seriously, are now removed from a practical process, which was worked with success for years by Mr. Swan, and also by his licencee, the late Mons. A. Braun, of Dornach.

Very few photographers will, however, we apprehend, use the old method of temporary mounting with a solution of india-rubber whilst Mr. Johnson's method is available. The point of vital importance is, that the lapse of Mr. Swan's patent places the manufacture of tissue in the hands of photographers, and that henceforth the manufacture, instead of being the monopoly of the patentees, will be the subject, doubtless, of general competition. Already we have heard of more than one establishment being contemplated for the purpose of supplying the public with pigment tissues, preparations having been in hand for some time in anticipation of the expiry of the patent.

Competition has been said to be the soul of business, and, as a general rule, there can be little doubt that it is a wholesome stimulant to the right conduct of business, by which the public gains in many ways. But not always there are many occasions in which competition, being directed to surpassing cheapness, or, rather, lowness in prices, is destructive of excellence. And there have been numerous instances in commerce in which a fierce competition, taking the fatal form of a race for lowness in price, has issued in the practical ruin of the manufacture, excellence being unattainable to the public on payment of any price. There is no danger of a competition of this kind, we hope and believe, in relation to the manufacture of carbon tissue. The race to be established will, we hope, be solely confined to excellence, to superior beauty, uniformity, and permanence. The Autotype Company, who have hitherto held the entire monopoly of this manufacture will now, doubtless, find their account in the uniform liberality they have shown to the public, which, other things being equal, will doubtless tend to bind to them a continuance of dealings with their customers. They have also a great advantage in the years of experience they possess, and in the possession of established machinery for manufacture and distribution of tissue, circumstances which should tend to excellence and advantage of various kinds to their customers. The Company have doubtless taken all these facts well into consideration, and in the circular they have issued, manifestly contemplate the cession to the public of one section of their monopoly with dignified equanimity. Regarding one step they take in this matter we congratulate the Company on the high-minded and dignified course they pursue. It is manifest that in granting licences under their various patents, the Company have the right and power to make such conditions and stipulations as they may think proper for their own protection, and one of the conditions of their licences hitherto has rendered it binding on the licencee to purchase his materials of the Company. This condition, of little importance when no competition existed, which might, perhaps, have been expected to become doubly binding when competition promises to become serious, the Company voluntarily withdraw. They will not place the licencee under an irksome sense of restraint. There is great wisdom here, as well as magnanimity. Under enforced conditions, other tissue would probably have assumed the form of forbidden fruit most desirable and tempting. The restraint removed, and no fear of free trade shown, the licencee will have little desire, probably, to leave the materials with which he is familiar and has succeeded hitherto. The Company doubtless feels strong in the fact that, whilst the general patent for the manufacture of tissue has expired, they still hold a patent for important improvements in the manufacture of tissue granted to Mr. Johnson seven years ago.

Mr. Johnson's patent for mounting for development without the use of adhesive substances remains a barrier for the next half dozen years to the public working of the double transfer process; but the single transfer process is free, and the manufacture of tissue for working it is free, so that an excellent system of carbon printing is now available, free from trammels of every kind. For our own part, we hold, and have continually held, that the small cost of licence fees for the use of all the improvements which able men have, at the cost of time and money, discovered, is not worthy of considering for a moment compared with the advantages gained, and we do not suppose that the earnest carbon printer, anxious to produce the best possible results, will permit the licence fee to deter him from possessing the benefit of any carbon patent by which he is assured a definite advantage will be gained.

One probable advantage of the increased competition will be increased experiment, and probably fresh discovery.

Already promise in this direction appears. We have just received a confidential communication from Dr. Van Monckhoven, announcing some important improvements in the manufacture of tissue. The communication being confidential, we cannot at present even indicate the direction of the improvement, which we shall, however, be able to announce in due time. In the meantime, we may say that should his discovery, on testing, be verified, and prove as he at present finds it, the result will have a most important bearing, not only on the manufacture of tissue, but on carbon printing at large.

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CYANIDE POISONING.

We have to record another death among photographers by cyanide poisoning. The assistant photographer employed at the School of Gunnery, Shoeburyness, a clever operator belonging to the Royal Artillery, poisoned himself last week with a dose of cyanide of potassium. It is doubtful whether the compound was swallowed deliberately or by accident; but it is difficult to see how any one fully conversant with the deadly nature of the compound could have taken a dose of it unawares. In any case, there is, unfortunately, little hope for the patient. Cyanide of potassium is so rapid in its action that if but a few grains only are taken, and the stomach happen to be empty at the time, little short of a miracle can save a man. The muscles of the mouth become rigidly set almost instantly, and the introduction of an emetic, or the tube of a stomach-pump, is well nigh impossible. In one case that came under our notice, the patient was insensible within five minutes, and had ceased to breathe after a quarter of an hour.

Emetics are of very little use under the circumstances, and the only trustworthy way of going to work, so doctors tell us, is the rapid emptying of the stomach with a stomach pump. Chlorine water (a solution made by mixing one part of chloride of lime with forty-five parts of water, and adding a few drops of sulphuric acid) is recommended by some, and solutions of iron salts (to form harmless Prussian blue) by others; but the stomach-pump appears to be the only hopeful remedy. Bathing of the head and spine with cold water is advisable, while the patient is otherwise maintained as warm as possible in bed; and to induce breathing artificial respiration may be tried. But, as we said before, in a case of cyanide poisoning, very little indeed can be done to revive the patient.

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FRENCH CORRESPONDENCE.

French Photographic Society—A New Objective—Preparation of Emulsions—Sciopticon—Reproduction of Drawings—Heliochromic Process.

The monthly meeting of the *Societe de Photographie* was held on Friday, March 1st. There was but a scanty bill of fare; in spite of every exertion to extend the programme, the meeting could scarcely be brought to last one hour and a half. It must not be inferred that research is being relaxed, or that new discoveries are not made; the cause is rather to be found in the fact that in France photographers are an uncommunicative race; only by incessant persecution (it almost amounts to that) can even the most untiring investigators be induced to make known the results of their researches. In England anyone before attending a meeting of this kind will ask himself, "What can I communicate to it?" Here, on the contrary, every one will be thinking, "What shall I learn?" without considering that each of his neighbours is putting the same question. If, under such circumstances, the programme of a meeting is apt to be a trifle meagre, the blame should fall rather on the members of the Society than on its officers. Nevertheless, in the above-named meeting, there were communications made which are decidedly worthy of being recorded.

M. Derogy exhibited to the Society a new and ingeniously-constructed objective for taking a reversed negative, which in some cases is indispensable. We have hitherto either used a prism or a plate placed in front of the objective, or submitted the sensitized plate to exposure from the back, or printed on a detached film, which has then been reversed. The apparatus of M. Derogy effects the operation in a much simpler and easier manner. He employs a prism, but he places it, not as before, *in front of*, but *behind* the lens. By this arrangement the prism need not be of so large a size; it is only necessary to be as large as the diaphragm which is used. It is thus less unwieldly and less expensive, while fulfilling all the necessary conditions.

M. Stebbing submitted to the Society an apparatus which he employs for the preparation of emulsions, and by the aid of which he can at the same time wash the bromide of silver collodion pellicle, and recover the alcohol and ether disengaged during the operation. This apparatus consists—1st, of a cylindrical water bath, which is filled with water, and heated; a thermometer is attached to the outside of this bath, and communicates with it by means of a tube, so as to indicate the exact temperature of the water; 2nd, of a second water bath made of porcelain, also filled with water, which is plunged in the first one, and is fitted to it at the top, so as to hermetically close it; 3rd, of a dome-shaped copper cover, fitting over all, which is pierced with two holes; the first of these is provided with funnel through which the emulsion is poured in; the second is intended to hold the handle of a whisk, formed of two silver whorls working across one another, which is plunged in the liquid; a mechanical contrivance made of wood, consisting of two toothed wheels in gear with one another, and a winch for turning them, serves to give a regular motion to the whisk, and thus to agitate the whole mass of the emulsion, and to facilitate the washing. Through a third tube the ether which is disengaged passes into the worm of a still, where it is collected. The alcohol is recovered easily from the wash water after the operation.

MM. Charconnet and Laverne had brought for exhibition a sciopticon which they have just introduced to the public. This is a very powerful magic lantern for enlarging and projecting on the screen transparent negatives or opaque positives. They were anxious to show its action at the meeting, but, unfortunately, the small space at the disposal of the Society prevented them from performing the proposed experiments. They were therefore compelled to confine themselves to exhibiting the apparatus, and to showing proofs of magnified copies obtained with it.

M. de Potoch, more fortunate in this respect, was able to give an experimental demonstration of the reproduction of drawings, engravings, plans, &c., by a direct photographic process, which has the advantage of being very simple. The prints are produced in a black trace on a white ground.

At the meeting of the previous month, M. Ducos du Hauron submitted to the notice of the *Societe de Photographie* some proofs obtained by his heliochromic process, showing a very great improvement; they are really much superior to anything yet obtained by this process. M. Ducos has just published, under the title of *Traite pratique de Photographie en couleurs*, a complete description of his methods, with the improvements which he has lately introduced. The most promising modification, one to which the author more especially attributes the success of his recent experiments, consists in the addition of *eosin* to the collodion instead of corallin, aurin, chlorophyll, and other substances which he had previously been in the habit of employing. The idea of using this material, which so well fulfils the requirements of the problem on the solution of which he was engaged (for it can be surely and rapidly operated with) was suggested to the author by a note of Captain Waterhouse, published in the English journals, and reproduced by Dr. Phipson in his correspondence with the *Moniteur de la Photographie.* It was remarked by this scientific Indian officer that eosin would, under a dry film of silver iodide, cause sensitiveness even to the green rays of the spectrum. Starting from this point, M. Ducos du Hauron experimented on this substance, and proved that the sensitizing properties of the tincture of eosin (equally soluble either in alcohol or water) extend to all the colours, and skilfully availed himself of this discovery. This circumstance proves once again how observations made in the course of research when published from day to day deserve the attention of investigators, even though the observations should be foreign to the field of study in which they may themselves be engaged. The following is the formula now adopted by M. Ducos du Hauron for the composition of the collodion for the three negative plates which he uses in obtaining his heliochromic prints:—

Alcohol of 40°	40 cub. cents.
Ether of 62°...	60 „
Pyroxylin	1 gramme
Cadmium bromide	3 grammes
Eosin...	15 centigrammes

The eosin is finely pulverised, and added the last thing to the collodion. It takes some minutes to dissolve, and the flask must be well shaken. Finally, the solution should be filtered, for eosin never entirely dissolves.

Ernest Lacan.

HARMONY.

BY W. HEIGHWAY.

Although I am advising you to a study of the principles of art, I do not desire that it should hamper your originality—if you have any—or suppress thought. If there is any irksomeness or restriction induced, there is some fault somewhere—most likely in your way of looking at art.

You must bear in mind that art is to be regarded as a guide to the study of the beautiful in nature, teaching you what to admire and why your emotions are excited, not as fetters to confine the soul, and keep you depressed to a low level of routine.

As it is not by chance that excellence is attained, even the productions of genius, as they must have their cause, so must they be governed by rules; but these rules are not *felt*.

The child has to spell "hard words" in his reading lesson, and you hear him toiling laboriously over the rough and stony road of a "first reader"; later he does not labour so much, nor stumble so often, but is he less regardful of the rules of orthography?

Composition in art may be said to be the selection and arrangement of means whereby to tell a story and embody it in an agreeable form. The principal care of the artist is to secure harmony and to regard the unities, that pleasure may be afforded the eye without any sacrifice of the truth of nature.

The artist must study, in planning his picture—

1st. Proportions.

2nd. Values, or light and shade in masses.

3rd. Detail; but not the niggling, worrying introduction of spots of light to break up and confuse the composition.

Harmony is simplicity, not complexity. Use such means as nature uses, and don't make your pictures confusing as Japanese puzzles.

One dark and one light place in every picture. Put in only such detail as will help the masses. In music, you know, all the notes are not high, nor are they all low; there are medium tones as well.

By the preservation of harmonious balance of lines, and of light and shadow, we get pictorial effect, pleasing to the eye, without reference to the meaning the artist wishes to convey by his picture, or how that intention has been carried out, and the consideration of the relative importance and value of each part of the composition, and how the principal objects are to find proper prominence, and parts of minor importance to be kept back in tone.

By the proper distribution of light and shade, and the arrangement of lines, the principal objects of a picture will be brought prominently forward, and those of less interest will have their place only as supports or foils to the more interesting objects.

Avoid spottiness—that peppering of lights all over a picture. These wandering lights worry the eye and confuse the senses. Some pictures I have seen look as if they had been put into loud check suits, and were extremely uncomfortable in consequence.

The economy of Nature is most marked in this—putting lights and darks only where they are required.

Don't try to be more skilful than Nature!—you'll find the attempt sad waste of time.

Keep all the broad, rich lights you can get, and let the half-tints look after themselves. No one admires "half-tints" more than I do—in their place; but it is pitiable sometimes to see how they humbug the lights and darks in photographic pictures, cutting them up and ruining effect.

This head. It's very pretty! Such sweet, delicate half-tones—so soft and nicely modelled! Is it, indeed? Why, all force and likeness have been "modelled" out of it, until it is poor and weak and senseless.

This comes of overdoing Nature. You have fined and refined until there is nothing left. This sort of thing is niggling—not Art.

Endeavour to make your picture complete in itself, be it of a single figure or group; don't let it appear to have been cut out of another picture. The head is the chief interest; every line, therefore, should be composed in regard to it, to strengthen, not to detract aught from it. Here should be the principal light contrasted by shadow, and all other lights and darks should be subdued and subordinate.

The popular idea, now-a-days, of the graceful pose seems to be in serpentining people over chairs, and twisting them into absurd and preposterous attitudes—positions no one of sane mind would ever think of adopting, even for "effect."

It's not effective—it's ridiculous! Folks don't crane their heads over their shoulders and try to look down their backs—*unless they think some mischievous person has labelled them!* Even then they would go to a mirror for advice.

It is not everybody who can do these photographic gymnastics. It's a good thing they can't! Grace does not need such tricks to enhance her worth. Art should be —(*should be?*—Art is) above such dodges.

Harmony of arrangement, harmony in pose, harmony in light and shade; harmony first, harmony last, and then go ahead.

How many photographs just escape being good by this fatal lack of harmony!

LIGHT AND SIGHT.

BY W. T. BOVEY.

Part II.—Sight.

Owing to the unsatisfactory phraseology conventionally employed to make thoughts intelligible, in the first division of my subject I deemed it advisable to note down colour as an existant and inherent quality inseparable from matter, and not as an evanescent impression, produced by external influences upon the machinery of vision. On the present occasion I purpose dismissing conventional usage, and shall refer to light and colour as external influences operating on the exquisitely sensitive nervous structure that conveys intelligence to the brain from the eye. To enable me to make my subject clear, I am compelled to draw upon the liberality of our Editor for presenting a simple diagram, which, appealed to, will convey intelligence through an eye medium which unassisted words would fail to reveal.

The optical arrangements of the eye so closely resemble the principle observed in the construction of a camera and lens, that I need not waste space nor weary the reader by going into physiological details *in extenso*. Two points are, however, worthy of a brief passing notice. First, the crystalline lens, C L, which is bi-convex in form, complex, yet so perfect of structure that its density gradually increases from without, inwards, and the increase causes a corresponding enlargement of its dispersive powers, which obviates the necessity of its drawing but little assistance from the "vitreous humour" to correct it for chromatic aberration.

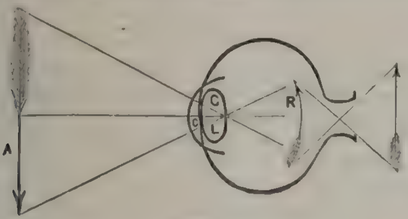

Fig 1

Opticians must often sigh over their work, and wish for more plastic material. Fibrous laminæ act well in the hands of Dame Nature. The optician's skill extends only to glass. Second. The inner surface of the sclerotic, or outer casing of the eye, is coated with black cellular pigment which, extending to the back of the retina (R), absorbs or neutralizes those rays which, having passed through the retina, would, but for the provisions stated, be reflected back again, and distinctness of vision would be impaired in any but a very subdued light. The photographer's interest in this matter consists of the parallelism observed in blackening the interior of cameras, and backing dry plates with yellow pigment to shut off mischievous diffusions of light.

Resuming attention to fig. 1, we notice rays of light passing from points of the arrow, A, to the eye, where they undergo refraction in the passage through the cornea, C, and crystalline lens, C L, and an inverted image is thus drawn on the outer surface of the retina. To comprehend fully the cause of the arrow, A, giving off luminous rays, it is essential that reference be again made to Huyghen's undulatory theory. It will probably be remembered by my readers that Huyghen's celebrated hypothesis assumes that light is produced by solar influence operating on an exceedingly rare fluid medium, or what I prefer to name magnetic ether. In order intelligently to recognize the indefinite, our ideas should associate the unseen with a visible, although necessarily an uncertain, parallel. For purposes of identity, we might in imagination conceive this magnetic ether to consist of transparent beads, as minute in dimensions as the mind is capable of grasping without danger of their slipping through crevices of doubt. These beads must be composed of a transparent and pliant material which the tread of a fly would cause to bulge in and make its surfaces oscillate in and out; the motion communicating corresponding movements to any number of millions of its fellows, if placed within touching distance and ranged in straight lines. The result, as portrayed in the annexed fig. 2, would, under the circumstances, be produced.

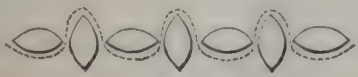

Fig 2

And an examination of the imaginary line passing around each bead, as the diagram shows, at once explains the mysteries attached to Huyghen's undulatory theory.

The direct solar rays impinge on the arrow, A (fig. 1), and are reflected or thrust back in continuous waves, which, entering the optical portions of the eye, at length paint another arrow on the face of the retina. We shall presently trace a connection between "reflected light" and the quality we identify as colour.

We now enter upon an interesting point of our subject. The arrow on the retina is in itself a dead image: by what means is it endued with vitality? It is just possible that my answer to this query has already been anticipated. As far as I am concerned, it is original, beyond the remark that "attached to the retina is a network of nerves which are gathered up at the optic nerve centre." The latter, probably, performs for the optic organism a service similar to that exercised by the spinal cord in conveying nervous force and impressions between the body and brain. The delicate complication of nerves that are attached to the organ of vision, when irritated, cause a sensation called light; and they are capable of producing the appearance of light when shut off from external influences. I have experimented a great deal in this direction with results which, interesting as they are, would require a deal of time and space to record. I shall, however, present an instance or two as examples. If we fix our eyes steadily, for a minute or so, on a gas jet or the flame of a paraffin lamp, then close the eyelids, and retire to a darkened corner, on pressing slightly on the "eyeball" we perceive an exact image (not inverted) of the flame, which, white, bright, and flickering at first, changes from white to a beautiful crimson fringed with blue. Gradually these colours gloom over, and become darker until they disappear altogether. Repeat this experiment in daylight, substituting for artificial flame a well-lighted window. On closing and pressing upon the eye, the form of the window, broken by any projecting object, such as a looking-glass, can be traced. It is, however, possible to excite light sensation without external agency other than pressure. If the nasal corner of the eye be pressed by the finger with an inward scratching motion, a vivid ring of light will be produced in an opposite direction. A heavy and sudden blow on the eye will "show fire," which fact all who can remember aught of their juvenile pugilistic encounters well know.

"Outer light," unassisted, cannot paint an image on the sensorium. We approach means of explanation when we consider the phenomena of nerve vibrations continuing after the eye is closed to the outside light, because, in this fact, we observe some amount of proof that the sensation of light, although mainly dependent on external influences for its existence, is produced by the complicated nerve structure that is attached to the brain. For the sake of clearness we should do well to take note of those wonderful provisions of nature which modify the velocity of nervous vibrations instantaneously, as the eye wanders from one object to another.

Figure, as represented by the image of the arrow R, is painted on the retina in shades that create among the nerves of sight vibrations of varied intensity, the lowest degrees of motion representing deep shadow and middle tints; the upper producing higher lights by their superior velocity. Each tint has its separate movement, each colour is produced by a scaled rate of rapidity of vibratory nerve motion. A similar rule has been clearly demonstrated in the phenomena of sounds. The number of atmospheric vibrations that are necessary to produce octaves of musical tones which blend and create pleasurable effects in the ear has been carefully calculated. In the theory just offered we have shown a reason for the changeful hues I observed in my experiments with the flame of a lamp. The earliest continuation of nervo-vibrations produced white flame; next red, fringed with blue; and as the nerve vibrations declined, the figure sunk into gloom, and finally was lost. Here we note an evidence that red is produced by a nerve velocity nearly equal to blue. Alas! philosophers are dead against me in this last calculation. If my conclusions are correct, we must perforce dismiss our cherished ideas concerning absorption of this or that ray portion of light, because if colour is merely a result of a certain rate of nervous vibration, it is clear that this rule operates in connection with the motive force which enters the eye; hence objects do not absorb in the ordinary meaning of that term, but, according to their surface structure, return the solar rays which impinge upon them with a uniform and characteristic degree of velocity, which forces, acting on the perceptive faculties of the eye, determine their form and colouring. Eminent physicists are of opinion, that were it possible to impart motion to a tensioned wire at as high a rate of velocity as exists in the motion of light, in lieu of sound we should have luminosity. This cannot be a correct supposition, because sound results from atmospherical pressure acting intermittently on the nerves of the ear, whilst light is of chemical origin; actinism is, however, intimately associated with the laws, I with feebleness have essayed to trace. Example: a camera when placed in the front of an object receives rays of light, that move with graduated swiftness, immediately the lens is "uncapped," on the rate of light motion depending the portrayal of high-lights, middle tints, and shadow; and it is easy to observe that the proportion of actinism present would, under ordinary circumstances, correspond with the greater or lesser speed of wave motions—white, a maximum; black, representing the minimum of wave force. This rule would not, of course, hold good where influences intervened to minimize thechemicalrays—such, for instance, as intense heat, where solar force, acting on the magnetic ether, would develop, not actinism, but free electricity, which ultimately explodes as sheet lightning, or as lightning accompanied with thunder. Red and yellow will not combine with actinism, although each has a high rate of wave force.

The arrow depicted on the retina, R, is inverted. How does the mind perceive it in its upright direction? Physiologists assure us that the correct placing of objects is an effort of mind. This appears to me a clumsy explanation, as it would only require a crossing of the nerves in an opposite direction to the light, as passed through the crystalline lens, to place an object as perceived by the senses in its natural position. The nerve arrangements of the eye are so delicate and minute in structure, that it is impossible to trace their directions with authenticated accuracy. Apart from the strictly optical machinery, the philosophy of sight must perforce be involved in much mystery, which only shows that, with all our boasted intelligence, the best among men are ignorant indeed. Others have ventured their theories, I have now increased the long list of guesswork. What I have written I offer as a modest addition. I commenced my subject by repudiating dogmatic pretension, and conclude by asserting that I should for ever feel grateful if, in my endeavours to shed new light on a difficult subject, I have succeeded in directing attention to a new track in scientific investigation which ultimately might reveal the whole truth.

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Correspondence.

PACKING NEGATIVES.

SIR,—It may be of interest to some of your readers to know of a safe method of packing a large quantity of negatives which have to travel a long distance and endure rough usage.

I have just transferred my printing establishment to London, and I am indebted to an amateur friend for the following plan of packing between two and three thousand valuable negatives. They were first placed in the ordinary grooved boxes, a layer of thick felt being first placed on the bottom; the spaces between the plates were then filled up with dry sawdust. Sheets of wadding were then placed on the top, and the lid fastened down, thus rendering each box a solid mass. These boxes were then packed in strong, heavy cases, the whole, with printing-frames, weighing over two tons; and I am pleased to say they were delivered here (at Dulwich) without a single breakage, or even a scratch.—Yours truly, PAYNE JENNINGS.

6, *Rosendale Villas, West Dulwich.*

TRIAL OF LANTERNS.

SIR,—The report of the trial of lanterns at the last meeting of the Bristol and West of England Amateur Photographic Association renders the following account necessary. It will be remembered that the trial above mentioned was not considered conclusive or satisfactory. I afterwards received a letter from Messrs. Newton and Co. expressing much surprise and dissatisfaction (at the results), which you will see was warrantable. It appears that Messrs. Newton had extended permission to other opticians to make their patent "Refulgent Lamp," and, unfortunately, some of them were made in an incorrect manner; one of these I was using in the lantern referred to in the last report. Messrs. Newton at once sent me one of their own Phantasmagoria lanterns and refulgent lamp complete; it was then at once evident where the defect lay. The lamp used on the former occasion had inadvertently been constructed with half an inch *less* burning surface *on each wick*. Last week, therefore, a most careful and crucial test was applied, with the following result.

As to triple wick lanterns. The only two in the market were tried: result, Newton's triple wick refulgent lamp was "superior to Hughes's triplexicon, in volume, quality, and diffusion of the light."

Secondly. As to double wick lamps. Newton's phantasmagoria lantern with refulgent lamp was decidedly "superior to the Sciopticon," there being better illumination, and more even diffusion of light.

It will therefore be seen that the triple wick lamps both gave a little more light than the double wicks; but it was considered that none of the three wick lamps at present in the market gave enough extra light to make it worth while to use them in preference to the double wick lamps when the extra heat given off, and the extra trouble of management, were taken into consideration.

The opinions here stated, I give, as they may interest your readers, and were the unanimous ones of all the exhibitors and others present, viz., the President, Vice-president, Treasurer, and Secretary of the Bristol and West of England Amateur Photographic Association. There were many other merits and demerits discussed; but these I will not enter upon, the light being that really under consideration.

I probably should not thus have troubled you had not the former communication on the subject have been sent.—I am, sir, yours truly,

H. A. H. DANIEL, Hon. Sec. B. & W. of E. A. P. A.

LIGHT AND SIGHT.

SIR,—Mr. Bovey writes, under the heading "Light and Sight," in the NEWS of March 1st:—"Newton's deduction, obtained from his study of the spectrum, although long regarded as correct, is now, in most cases, discarded in favour of the teachings of Brewster, this eminent experimentalist having proved almost conclusively that the seven colours, as seen in the spectrum, are the result of admixture; that the true spectrum consists of three colours only, viz., red, blue, and yellow."

This statement is so far from the truth that it ought not to remain unchallenged. I very much doubt if Brewster's three-primary theory of the spectrum has ever at any time been so generally accepted by men of science as that of Professor Young, in which red, green, and blue are held to be primary colours. Young's theory, if I mistake not, is of older date than Brewster's; and among eminent scientists who have given it their support may be mentioned Sir J. Herschell, Airy, Helmholtz, and Clark Maxwell. It was long ago proved that the experiments upon which Brewster based his conclusions were inexact. The opinion that no three-primary theory will account for facts observed is now, I believe, generally prevalent in the scientific world. The public often cling to theories long after they have been proved untenable and been abandoned even by their originators; so I have no doubt that red, yellow, and blue will long continue to be considered primary colours.

For the benefit of those who believe green to be a mixture of blue and yellow, I will briefly describe two simple experiments. Divide a circular disc of white cardboard into six or eight, or any even number, of sectors of equal size, and paint them alternately blue and yellow. If this disc be now made to whirl rapidly round its centre, which may be conviently done by placing it on a spinning top, the two colours will practically be received simultaneously on the retina of the eye, and the resulting impression is, not green, but white. If either colour is in excess of the other, the impression will partake of that colour which predominates. The second experiment is performed with the aid of a pair of magic lanterns, or, failing them, a pair of common bull's-eye lanterns. Adjust the lanterns so that the discs of light, thrown upon a sheet or other white ground, shall coincide. Now place before the lens of one lantern a piece of transparent blue glass, not too dark, and before the other a piece of yellow glass. The two colours will thus be blended together on the sheet, and, if properly selected, will produce a nearly pure white. This experiment may be rendered more striking by turning the lanterns so that the two circles of light formed by them shall overlap each other; the colours are then shown simultaneously separate and combined. Other combinations may be tried: suitable shades of green and red glass will produce a brilliant yellow—one of the facts upon which Young based his theory.

I feel that I ought not to close this letter without a word in explanation of the fact that blue and yellow pigments mixed produce green, or blue and yellow glasses superimposed transmit green light. Mixing pigments on a palette is a process of subtraction, not addition of colour. In the mixture, the blue absorbs all the red and yellow rays, and the yellow absorbs the blue and violet rays, so that only green remains to be reflected. Similarly in the case of blue and yellow glasses superimposed: the blue stops all the red and yellow rays, and the yellow all blue and violet rays, green being the only colour which can pass through the two. Most blues contain green, though imperceptible to the eye, and are therefore capable of reflecting or transmitting green rays.

I refrain from any comments upon the remainder of Mr. Bovey's paper, having no wish to enter into a controversy.
Yours, &c., F. W. Reynolds, B.A.
Warrington, March 5th.

WHITE CARBON.

Sir,—Mr. Duby's explanation of his reason for using the term "white carbon" appears to me rather mystifying than otherwise. Surely when he had got the German original designation "pigment papier," the proper and literal translation would simply be "pigmented paper," and the prefix added would exactly give us what he wishes to say, viz., "white pigment paper."

But has anybody seen any specimens? I confess to having tried for years to produce pigment pictures with a white pigment on a dark or coloured ground; but I could never meet with any *white* pigment that was not so fearfully stained by the bichromate as to be utterly useless. With kaolin the case may be different, but no one who has even tried kaolin and gelatine mixed together would ever dream of employing them. Supposing the picture could be developed successfully, there would remain a dirty flat-looking image, but not in *white* pigment, certainly—in short, a result differing as widely from the splended effects now obtained by pigment printing as can possibly be conceived.

However, the Germans are very clever people, and if Mr. Honikel can show us something good, no one will be more ready to acknowledge it than—Yours, &c., J. R. Sawyer.

[The discussion on the term "white carbon" need not be continued, as Herr Duby has stated he merely used it as a *facon de parler*. As we before stated, we have seen photographs in white pigment; we also said that they were not successful. In fact, whilst interesting as experiments, they were not tolerable as pictures.—Ed.]

Proceedings of Societies.

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held on Thursday evening, the 28th ult., at the Free Library, William Brown Street, Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. B. J. Sayce and Mr. Arthur Hall were elected members of the Association.

The Rev. H. J. Palmer exhibited a scenograph to which he had invented a base-board giving perfect rigidity, and which could be used on any stand. He (Mr. Palmer) then read a paper on "Cardboard Slides for Gelatine Films" (see page 110). In illustration of his paper Mr. Palmer exhibited gelatine films as substitutes for ground glass, new non-actinic muslin, and some simple cardboard dark slides for the scenograph.

Mr. J. H. T. Ellerbeck suggested that the latter would be stronger and stiffer if made with what was known as shalloon board, which was much harder and thinner than cardboard.

Mr. Palmer said that at the last meeting he had been unnecessarily abusive on ox-gall. It was quite usable when fresh, but he found it to vary. The best plan was to purchase the gall in the bladder and suspend it in a cool place for a day or two, by which time the filmy mucus sank to the bottom; the ox-gall on the top could then be used without filtering. It was also paler in colour, and thus better.

Mr. Ellerbeck then passed round a number of Mr. C. Ferranti's artistic studies, which had been lately so favourably reviewed in the photographic journals. Many of these were exceedingly beautiful, and, though some might object to their highly-polished, glass-like surface, it was no doubt in consequence of the surface that the brilliant tones and permanency of the pictures were secured. He (Mr. Ellerbeck) then read the following communication, which excited considerable amusement by the manner in which he had contrived to bring into use the names of the members of the Association:—

"Our Society.

"Some time ago one of our members remarked that during the whole of his attendance at our meetings he had never seen a smile on the face of any present. This struck me as such an unenviable reputation that I suggested a comic song; but he, being perhaps the most solemn of us all, declined. The wish to infuse a little more liveliness into our meetings is my only apology for the abominable play upon words in a few lines I have to offer.

"As the leading amateur photographic society in England we ought to be proud of our position, eclipsing as we do even the aristocratic Londoner. Have we not to-night a new Hall? A King has led us to the field; a Banner floats on our outer wall —aye, two (Whalley). Do we not recognise the abilities of our Castellain to guard the gate—our Clarke to give us safe advice in trouble—our Cooke to look after the inner man? The Potter's art is frequently in requisition, and the Palmer relates round the fire stories of his travels in the land of the Bruce. Let us further see what we have to boast of. Stretching lazily in the sun as far as eye can reach the Shannon waters our land, skirting the Greenwood and the Moore. There cattle free from murrain (Murray) seek the river and Wells. In a secluded spot is the Kirk by the Green meadows, where a grave has been dug—a whole grave (Houlgrave)—in which a man can, if he find his pen dull, bury (Pendlebury), the work of his brain. (It's a pity a large proportion of our would-be authors don't do it, or practice cremation.)

"Still generation follows generation—Will's son follows William's path, and a warm boy (Wharmby) he is. Roberts and Robertson, John's son and Parkinson follow in the footsteps of their 4 fathers, and thus the good work is perpetuated. By-the-bye, it is a remarkable fact that, though we have such a great FORREST, it is transparent as glass, bearing only a single TWIGGE, so that we have, even in its deepest recesses, no difficulty in seeing the heavens (EVANS) above—a great consideration for photographers. I should like to make a suggestion: it is that we admit to our ranks any lady who may wish to join us. We promise not to tire her (TYRER), and though we cannot offer her a tirewoman, we can provide a TYERMAN. But what would be SEDDON such an occasion? One might feel inclined to put a rope around (ROPER) *his* neck whoever suggested the idea, only we HOUGHTON to. But I'm getting rather HEYES y on this point, and when a mans *led on* (SLEDDON) to make such remarks as these the sooner he stops the better. Was it not in Pickwick Sam wELLER BECKoned to the Rev. Mr. St. HIGGIN s whispering the advisability of 'drawing it mild,' and nothing RILEY d him so much as humbug with a long tongue (LONGTON). We would soon get HUGHES to the ladies and not go SPOON(i)LY paying too much attention to the fairer members unless at our annual soirée we could DANSON the 'light fantastic toe' to the tune of WEBER'S last waltz—they in ball costume, flowers looped on (LUPTON) their beautiful tresses, or DOD ging their partners through the intricate mazes of the polka, rejoicing AT KIN dred feelings awakened. WHAT LING ering glances! what soft speeches!

"I have again to apologise for reading such rubbish as this, fit only for a booth rodomont (BOOTHROYD), but it was conNIVEN at by our Secretary, so I thought I would bring it as it was the BEST I could do, and *say* something (SAYCE) that might amuse, though it won't instruct. I hope nobody will be offended at being left out in the cold. There is one I can't introduce except in the old saying—if PHIPPS and haws were little jackdaws, there'd be no work for tinkers. This does not seem to be the correct saying, but MAUDS LYing down as I write this, and I don't like to disturb her to ask which is the right one.

'A little nonsense now and then
Is relished by the wisest men.'"

Mr. ELLERBECK also exhibited a knapsack for camera, &c., which was arranged so that the weight shall rest on the back instead of on the shoulders.

After votes of thanks had been passed to Mr. Palmer and Mr. Ellerbeck, a number of slides taken by Mr. Potter, Mr. Kirkby, and the Secretary were shown by aid of the lantern, and the meeting was then adjourned till the 28th instant.

Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will take place on Tuesday next, March 12th. at 5A, Pall Mall East, when a paper by Dr. D. Van Monckhoven will be read entitled, "The Fading of Carbon Prints, and Carbon Printing Without the Use of Bichromates."

GRAPHIC PORTRAITS.—We have received from Mr. A. Ford Smith, of Llandudno, some examples of an interesting novelty which he styles the Graphic Portrait. The wax paper negatives for backgrounds Mr. Smith will prepare and supply to the public. More in our next.

To Correspondents.

M.—Your question, "How to proceed with the dry plate process?" is a little indefinite. Which dry plate process do you wish to work? Have you any experience in any dry process? If you have not, your best plan is to take the NEWS or YEAR-BOOK, and, selecting a dry process, proceed to carry out the instructions laid down. Perhaps you cannot do better than try the coffee process as described in our YEAR-BOOK for 1877, by Mr. Whitehouse. The process is simple and easy, the results very fine, and the process does not involve a serious departure from the ordinary operations of the wet process.

F. G.—It is possible to secure vigour in collodio-chloride prints without citric acid. Excess of nitrate of silver will compass that end; but it is more satisfactorily effected by the addition of citric acid about one grain to an ounce of the emulsion; properly worked, we have found the prints quite permanent. We have now in our possession some of the examples produced nearly fourteen years ago, when we were first working out the process, and they are still unchanged.

W. P. D.—In developing and intensifying negatives of prints for photo-lithographic work it is of more importance to be familiar with principles and modes of working, than to have a specific formula. A weak developer tends to density and contrast. About ten grains of the iron salt, and twenty minims of acetic acid to an ounce of water. A ripe collodion. As much light as you can get. After intensifying with mercury and cyanide of silver, you can again intensify with pyro and silver, and after that with mercury and iodide of potassium. Mr. Osborne published his method of clearing negatives in our pages ten or a dozen years ago, and it has been published several times since. It was first published in our number for October 10th, 1862, where Mr. Osborne describes his mode of producing negatives for map-work in photo-lithography. The plan consists in applying a solution of iodine to the negative made by dissolving iodine to saturation in a two-grain solution of iodide of potassium. A little of this is added to water and applied to the negative, which is subsequently treated with hypo. This removes the deposit or film of silver which takes place during development, and intensification on the transparent parts of the negative. We do not know of any published details of applying the prussiate of potash and citrate of iron process to wood blocks; but we should think it would not be difficult to do.

AN ANXIOUS ONE cannot have read his journals carefully. Nothing is more common than the silver bath for sensitizing paper becoming red, and nothing more easy to cure. The colour is formed by portions of the albumen being dissolved by the solution, and darkening gradually by the action of light. To remove the colour, shake up the solution with kaolin, and filter; or add a little common salt. shake up the solution, and filter. To prevent the discolouration in making the bath, add about three ounces of alcohol (methylated will do) to every pint of solution. It is a good plan to add a little carbonate of soda, or a little powdered chalk, to the new bath. This will keep the solution neutral, and on returning it to the bottle, shake up the deposit with the solution, afterwards decanting carefully, or filtering into the bath. This will keep the bath always colourless.

B. L. R.—Common sheet glass is much the cheapest, and answers every purpose for glazing a studio. White glass does, of course, possess an advantage in not obstructing actinic light; but it is costly, and frequently requires renewal, inasmuch as it rapidly acquires a yellow tint from the action of sunlight, and, unless changed, obstructs a considerable amount of light.

FOUNDATION.—Tissandier's "History of Photography" is published by Messrs. Sampson Low and Co., Crown Buildings, Fleet Street. Your local bookseller will get it for you; or if you send the price, 6s., and amount of postage, about 6d., to our publisher, he will forward it to you. 2. You will find many articles on enlarging on opal glass in our YEAR-BOOKS. It is impossible to give you anything like detailed instructions in this column. You require a ripe collodion, bath in good order, developer of pyrogallic acid two grains, acetic acid half a drachm, water one ounce. Expose pretty fully, and do not over-develop. 3. Castile soap dissolved in alcohol is what you require for application before burnishing.

X. Y. Z.—It is customary to add the cyanide fixing bath to the hypo fixing bath, and precipitate the silver as a sulphide by the addition of liver of sulphur; or you may precipitate it as a metallic powder by immersing clean plates of copper or zinc, slightly acidulating the solution with sulphuric acid. The gold in a sulpho-cyanide toning bath may be thrown down in the usual way by the addition of sulphate of iron.

G. M. M.—You should avoiding holding such plates by a corner. They should be held by a pneumatic holder, so that nothing may risk injuring the film. We should have thought that the plates would have received a substratum to prevent the slipping of which you speak. An edging of varnish before developing would help to preserve them. But the chief reliance in preventing loss of films is skill in manipulating, which must be gained by practice. We have seen films loose all over the plate, except round the varnished edges, finished without crack or wrinkle by careful manipulation.

TRIP TO BRITTANY.—A recent correspondent asked for hints in relation to a photographic trip to Brittany. An old correspondent, Major Gordon, La Ville, Gondelin, Dinan, France, kindly offers to furnish hints to any of our readers who may consult him on such a trip.

R. G.—The gum-gallic process is described by Mr. R. Manners Gordon in our YEAR-BOOK for 1868, p. 32.

W. MARQUAND.—Thanks. We shall probably refer to the matter.

DR. VAN MONCKHOVEN.—Received. Many thanks. Your communication is very interesting.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. BROADHEAD, Leicester,
Photograph of Mr. J. Danks.

The Photographic News, March 15, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Value of Photographic Negatives—War Preparations and Photography.

The Value of Photographic Negatives.—Some months ago, on the occasion of the death of M. Thiers, we made a few observations upon the value of negatives, and cited the instance of a humble travelling-photographer who, at one lucky *coup*, became a comparatively rich man. He had seen the great French statesman, the very day before he died, upon a balcony of the Pavilion Henri IV., at St. Germain, and had asked permission to take a portrait of the old gentleman. The ex-president of France readily consented; but when, the next day, the photographer came to submit proofs of the picture, he found the villa closed, and the household bewailing the death of their master. The negatives thereupon reached a fabulous price, and we are told that three thousand pounds were refused for them. At the time we were not altogether prepared to believe in this large sum, but, by the aid of other lights, there would scarcely seem to be any improbability in the story. Last summer two or three portraits were taken of Mr. Gladstone at Hawarden. The right honorable gentleman was in his wood-cutter's costume, for he was in the act of felling a tree at the time, and the value of these simple negatives, we are told, is not less than one thousand pounds. In this case there is certainly no exaggeration, for it was stated in evidence at the Bolton County Court that the London Stereoscopic Company had actually offered that sum.* There was a dispute over the matter, it seems, and that is how the circumstances of the case came to be made public. They were as follows. A large deputation of Liberals paid Mr. Gladstone a visit in August last, and were permitted to stroll through the grounds and park at Hawarden. Mr. Gladstone was asked for an address, and during a rest in the operation of felling a tree, the ex-premier complied with the demand made upon him. A request was then made that he would permit himself to be photographed then and there in his woodcutter's dress, and to this he likewise offered no objection. A series of negatives were taken—six, we believe —and these (last week) formed the subject of litigation at the Bolton County Court. The plaintiff was a law stationer, named Chambers, and he claimed to have originated the idea of photographing Mr. Gladstone in the manner attempted, and the photographer, in return, had, so the plaintiff alleged, promised to give something handsome if the affair turned out a profitable one. That such was the case there was no dispute. Mr. Currey, the photographer in question, and the defendant to the action, refused the thousand pounds offered by the Stereoscopic Company, and accepted what he held to be a better bargain. This was to sell a half share in the negatives for £500, and to reserve to himself, moreover, certain rights connected with the pictures. The law stationer, in the meantime, had received nothing for services which he claims to have rendered, and, finding that Mr. Currey had forgotten him, brought an action at the Bolton Court for eight guineas. On the part of the photographer the claims of Mr. Chambers were altogether denied, and in the end the judge directed a verdict for the defendant, on the ground that no contract had been entered into between the parties. Into the merits of the case we do not desire to enter; we only wish to point out the circumstance of a few negatives being of such great value—photographs, too, which, after all, can scarcely command so extensive a sale as many popular subjects. We in this country, who grumble a good deal about copyright and copywrong, are scarcely so much to be pitied as some of our brethren on the Continent. In Germany, for instance, no photographer could get such a price for a negative or series of negatives. If Bismarck were to don the woodman's habit to-morrow, and take to woodcutting, a negative of that renowned statesman would not fetch a thousand pounds, nor, we make bold to say, a thousand shillings. Our German cousins do not enjoy the same protection for these works as photographers in this country, and, consequently, there would be no guarantee that prints for sale would only be printed from the legitimate negatives. A photograph of the Prince of Wales in Masonic costume, which was taken some years ago, proved more valuable even than those of Mr. Gladstone we have cited; while Mr. Mayall's pictures of the Prince and Princess in their wedding dresses simply realised a fortune. British photographers have, therefore, at times, much cause for congratulation.

War Preparations and Photography.—Photography is recognised to such a degree in our army, that no preparations would be considered complete unless every requisite of the art was at hand. In the general war preparations that have recently been going on, so that we may be ready should worst come to the worst, an equipment of photographic waggons, each to accompany an army corps or division, as the case may be, has not been forgotten. The army photographic waggon is a very complete and compact affair. It is, under ordinary circumstances, sufficiently roomy to permit of a couple of operators working at once, and may, at will, be converted into a dark room or working room. The waggon is an easy load for a pair of horses, which are driven postillion fashion by one of the Engineer train. A box permits of two or three Engineer photographers to ride outside, while one or two more may, if need be, ride inside. The interior is by no means close and stuffy, for there are four large windows at the sides which may be opened. The entrance is at the end, as in an omnibus, and the trapdoors in the floors lift up and disclose roomy baths. Pigeon-holes in profusion are at hand to stow away prints and mounts, and the chemicals are well packed in tin cases. A very large supply of collodion is provided, and pyroxylin for the making of more has not been forgotten. Apparatus and printing frames, all stout and durable, have been selected especially to resist hard wear and tear, and of cameras there are several examples, in case of accident or loss. Of course, in a case of this kind, saving of cost is a secondary matter, and thorough efficiency the only point to be regarded. Hence photographers in general would scarcely care to follow out the details of equipment in constructing movable photographic laboratories for themselves. Moreover, unless under very exceptional circumstances—say in the case of a special photographic war correspondent—such elaborate and precautionary measures would be thrown away, for there are not many of us who could afford a pair of post-horses and a postillion to carry us about the country. At the same time, the military photographic waggon would teach photographers something, as furnishing an example of the many and multifarious precautions necessary to be taken in order to ensure successful working upon a hard campaign, when the services of the military photographer to copy plans and maps of an unknown country, or to ensure reconnaissance views in the neighbourhood of an enemy, are promptly required. As yet the duties of the military photographer are but vaguely known; but circumstances might arise at any moment when the commander-in-chief requires his services. In illustrating military reports, and furnishing information to the authorities, the photographer will henceforth be very useful to generals in the field, while his services in surveying and in the making of maps will be particularly useful to the commanding Royal Engineer. It is only in the British army that a complete photographic equipment of this kind is to be found.

THE ELIMINATION OF THE NITRATE SALTS FROM GELATINE EMULSION.

BY F. WRATTEN.*

It was proposed by Mr. Taylor, at the close of the February meeting, that I should on this occasion demonstrate to the members my latest published method of washing gelatine emulsions. It was also announced in the journals of Friday last that I would demonstrate to the members the development of a washed emulsion plate. I have come prepared to do both. We will take the subject of gelatine emulsion washing first.

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* It is only right to state that the Company have denied this since the publication of the report in question.

* Read before the South London Photographic Society.

In order that I may make my proceedings both interesting and useful to the members and visitors present, I will first proceed to describe the method of compounding the emulsion, and give a useful working formula. To many here present I doubt if I have the ability to teach anything. What I have to say will be to them as an "oft-told tale," but I know their patience, and rely upon it for their attention. I shall feel myself amply compensated if but the least experienced member here present shall gain one new idea. I can leave the rest to him, satisfied that it will not remain dormant.

In a gelatine emulsion the simplest form of emulsion is exemplified. Its components are almost invariably but bromide of silver and gelatine. It is true there is now and then a talk of adding thereto a chloride, an iodide, or a fluoride, but I doubt if many experiments include either of these ingredients; the bromide alone absorbs all, or nearly all, the attention. I cannot doubt, from what I have done already, the benefit to be derived from the addition of an iodide, especially for scenery in which foliage and trees predominate. The outlines appear to me to be more sharply cut against the sky; in point of fact, the picture seems to bear a closer resemblance to the wet plate. The only necessary ingredients of a gelatine emulsion are three: the gelatine, the bromide of any base—ammonium, potassium, cadmium, or any other, according to taste—and nitrate of silver. Let us suppose we have to compound ten ounces of gelatine emulsion. We shall require (say) 200 grains of gelatine (I like Nelson's No. 1 quality), ninety grains of bromide of ammonium, 150 grains of nitrate of silver, and nine ounces of water. During the operation of washing, the gelatine will take up the remaining ounce of water. We will select a bottle which has a good stopper—one that fits closely and well. We will place therein the gelatine, the ammonium bromide, and six ounces of distilled water, shake well until the gelatine is well covered by the water, and then stand it aside to soak for half an hour. Now we take a similar bottle and place therein the nitrate of silver and the remaining three ounces of water to make up nine ounces. When the gelatine has been well soaked we stand the two bottles in warm water (say) of a temperature of 100° Fahr., and solution will soon come about. Then we unite the contents of the two—not slowly and with frequent shakings between, but empty the one bodily into the other, and shake well for some minutes. This plan of adding the whole bulk at once would not do if the solutions were not *aqueous*, as in collodion; but there is no drawback to it whatever in gelatine emulsion work, for both the bromide of ammonium and the nitrate of silver being perfectly soluble in water, incipient decomposition cannot take place. In other words, there can neither be "locked-up" silver nor "locked-up" bromide, as might be the case if the solutions were overcharged, as in adding nitrate of silver in alcohol to bromised collodion. We have now a crude emulsion containing both free bromide of ammonium and nitrate of silver, for the resistance presented by the viscidity of the gelatine operates effectually to prevent instant decomposition of the whole of either.

Now, what is double decomposition? Simply interchange of elements—exchange of bases. In this case the nitrate of silver and the bromide of ammonium exchange bases, forming bromide of silver and nitrate of ammonium; whereas, before this is brought about, we had bromide of ammonium and nitrate of silver. A very simple experiment will illustrate this to the uninitiated. Here I have two bottles; the one contains nitrate of silver in water, the other bromide of ammonium, also in water. I unite the two, and instantly you see the result; there being no preventing medium, insoluble bromide of silver subsides, and nitrate of ammonium, being soluble in water, remains in solution. In this case it is easy to separate the two by simple decantation, and rinsing with fresh water.

It is perfectly natural for one at first sight of this experiment to say, "Well; if this be so easy, why not make your bromide of silver in this way, and add it, after washing, to the gelatine solution?" Exactly; but for the most cogent reasons this will not do. Bromide of silver thus formed is only sensitive to light in a very minor degree—a degree totally useless for photography. It is necessary that it should be formed in combination with organic matter; and in gelatine we have organic matter capable of imparting to bromide of silver the highest degree of sensitiveness with which we are yet acquainted. But when we employ gelatine the bromide of silver formed therein does not subside, but remains in suspension, while the by-product (nitrate of ammonia) remains in solution; hence they may be said to be in juxtaposition, and simple decantation will not achieve our object—it will not separate the one from the other. Here, then, we are in the presence of a difficulty which must be overcome. We must get rid of this by-product, or it will crystallise on the surface of the dried film and render it useless, and the question arises how best to surmount it.

There have been already published five methods of eliminating the nitrate salt, and, with your permission, I will recapitulate them, and say a word or two in regard to each in succession. First, we have the beautiful principle of dialysis; second, we have the method of pouring out to set in a dish, and washing with a running stream or frequent changes of water; third, it has been recommended to pour the warm emulsion into a bottle, and, holding it horizontally, to roll it round under a running stream from the tap, until it has set in an even film round the sides; fourth, we have alcoholic precipitation; and, fifth, we have the method I wish to demonstrate to you this evening.

1. As to dialysis. Here we have an instrument—a bell glass—specially made with a returned edge for this purpose. We tie over the bottom a piece of bladder or parchment paper. We pour into the dialyser the warm gelatine emulsion so soon as we deem it ripe, stand it upon a support in warm water, letting the warm water come up its sides as high as the depth of the emulsion. Gelatine is a colloid body, and nitrate of ammonia is a crystalloid. This method of separating crystalloid from colloid was the discovery of a Mr. Graham. He found that gelatine and other analogous colloid bodies would not pass through the septum—that is, the parchment paper—whereas the crystalloid salt would do so; hence, theoretically, this ought to be a perfectly good and useful method. But it has one serious drawback—we cannot allow time enough for the operation, for our material may decompose and be useless when finished. Moreover, we can only apply it for small quantities; hence we may dismiss it as being theoretically perfect, but practically almost useless.

2. Now we come to the second method of pouring out into a dish to set, and then washing by repeated soakings and changes of water or with a running stream. This method is perfectly effective if you will give time, and can always determine *how much* time and *how much* water will accomplish your purpose. But, inasmuch as one does not always wish to make up an exactly similar quantity of emulsion—but one day may have requirement for a large quantity, and another a small—variation in depth or thickness of film will lead to the obvious uncertainty that at the expiration of a given amount of time the required amount of work has been performed. I think, therefore, No. 2 may be dismissed without further comment.

3. We have the method of pouring the emulsion while warm into a bottle, holding the bottle horizontally under a running stream from the tap until it has set round the sides. This plan, while open to the same objection as the washing in a dish, is more troublesome and difficult to perform. It is not always possible to prevent the formation of clots varying in size from that of a hazel nut to a walnut, and, these once formed, it is simply impossible to get rid of the whole of the nitrate salt by any

amount of washing. It is none the less a very ingenious plan, and served me well on more than one occasion.

4. We come to the method of precipitation by alcohol. I found this method very useful to me when, for the want of a more effective plan *than either dialysis or washing* in dishes or bottles—when, in fact, the hot weather had nearly reduced me to despair—the gelatine would hardly set, and the cistern water was tepid, and what was I to do? Necessity stared me in the face, and who can afford to despise necessity? Gelatine plates were required, and I must make them; but *how?* In this dilemma, after a deal of cogitation, I suddenly bethought me of the result which sometimes comes about when that useful mountant, "parlour paste," is made, namely, the subsidence of the gelatine or dextrine when alcohol is stirred in, and I at once, and for the first time, under the sharp spur of necessity, saw clearly the principle underlying this subsidence. I could now understand that the strong affinity of alcohol for water caused the latter to leave the gelatine to unite with the alcohol, and I felt sure that in leaving the gelatine it would take with it the nitrate salt. I tried it, and with complete success. Others have tried it as I published it, and successfully. *One* gentleman, I know, precipitates with alcohol twice, and is a firm advocate for the *modus operandi* at this time. Another gives the emulsion a preliminary washing, and afterwards precipitates with alcohol, and, I am bound to say, with the most complete success. Alcohol has also, I believe, a preservative influence in gelatine emulsion, and certainly renders the task of coating the plates much easier. The emulsion flows more freely to the edges, and does not recede. Thus much for alcoholic precipitation.

5. Now for the method I published in the Year-Book for 1878, and which I now proceed to demonstrate to you. I must premise that the emulsion has been made, that decomposition is completed, and that it has been poured into a dish, scraped up with an ivory knife, and transferred to this bag made of "marking" canvas. The box before you is made with sloping sides, which render a ledge inside unnecessary. To make my dish I employ two concentric oblong frames and this piece of calico. I do it in this manner:—I now fill the trough with water, and the tray is floating thereon. Two or three twists of the bag, and one draw through the thumb and forefinger, effect the purpose. The gelatine lies in the tray in extremely fine division, and I have reduced the time of washing from five or six hours to five or six minutes, and, what is better, the washing is well and perfectly done.

PHOTO-PRINTING IN NATURAL COLOURS.

BY PROF. J. HUSNIK.[*]

We know from the laws of optics that white light can be separated into the three primary colours, red, yellow, and blue, and that these again, by combination of two and two, will form the three secondary colours, orange, green, and violet. White, black, and grey, are not themselves colours, but a combination of all three colours. Thus black objects absorb all the rays of light, and reflect none; white reflect all, and absorb none; while grey objects partially reflect and absorb all the rays of the different primary colours, but in an equal degree. A dark or light colour is due to the amount of light; thus carmine red may have every shade of that colour, according as it is more or less illuminated—in other words, as it is more or less mixed with black or white.

If we print on a piece of white paper, dark-red, dark-yellow, and dark-blue, one over the other, we get black; so by printing two of these over each other we shall get, according to the combination, orange, green, or violet, always supposing that we use transparent colours. The theory of the three primary colours has been long known, but it was not so well known that by printing them together we could produce a black, or any shade of any other colour, according to the proportions of the colours with which we printed.

In the year 1870 it was suggested, in a communication to the Society at Berlin for the Advancement of Photography, that these principles could be made use of to obtain mechanically photographic prints in natural colours. It would be merely required to prepare three equal-sized negatives of which one was taken through a violet, the other through a green, the third through an orange glass. The violet glass would allow only red, blue, or violet rays to pass, and would exclude all the yellow colour; the former would therefore appear on the negative as opaque patches, and on the print as lights. All the yellow, all the dark shadows and black tones, will give transparent patches on the negative, and this will become a plate from which we may print in yellow. The same reasoning would apply equally to the negative taken through green or orange glass. And since in all three negatives the black tones and dark shadows would appear as transparent, and on the print as dark patches, on the complete print of the three primary colours over each other they would appear black. But in any place where one of the three primaries had the predominance, there the black or grey would have a decidedly coloured tinge. Pure red, pure yellow, or pure blue would produce transparent spots on only one of the negatives, and on the other two opaque ones; in printing, therefore, the colour would appear in its original purity. Pure secondary colours, orange, green, or violet, on the other hand, show themselves each on the corresponding negative as opaque, and on the other two as transparent spaces, and are produced, therefore, in printing by the use of two plates. All other combinations and shades in which all three primary colours are present, but where one or the other predominates, will be produced by printing with the three colours, and the required tone will be produced by the amount of each possessed by the natural object. Care, of course, would have to be taken that in printing one on the other the outline of each plate fitted accurately.

The process here described, though correct in theory, was accompanied in practice with very great difficulties. The negative of an object illuminated by direct sunlight could only be obtained through a green glass with difficulty, and through an orange glass it required an exposure of one or two hours. Besides, the negatives produced through the orange-coloured glass proved not to be correct for a blue printing plate, for the blue rays, which at all times will pass through an orange glass in small quantity, are sufficient, with so long an exposure, to produce a greater effect than even the yellow or red rays, so strong is the actinic action of blue light as compared with that of the other colours. It became, therefore, of prime importance to find a preparation as sensitive to the yellow and red as it is to the blue rays; also so to select the colours that, in printing, one should not mask the others, but that each should produce in correct proportion the proper effect on the required combination.

The exposure under violet glass need not be long. As the blue rays have a so much stronger chemical influence than the red ones, such a violet must be chosen as appears by transmitted light rather red than blue; the violet colour itself, moreover, must be deep and dark in tone. For the same reason, green and orange-coloured glasses, in which the yellow predominates, must be selected.

To take the negative, place the prepared plate and the coloured glass together in the camera, separated only by the thickness of a piece of paper, of which strips may be pasted round the edge of the glass; or fix the coloured glass in the camera in such a way that no white light can penetrate between it and the sensitive plate. Another method is to illuminate the object separately with light of the three primary colours, which can be effected by having movable shutters of coloured glass in the work room. This method possesses the advantage of preventing loss of light through reflection.

By using a process similar to the one above described, Herr Albert has succeeded in producing pictures of stationary objects printed mechanically in natural colours, and we may entertain the hope that, with improved methods. living and moving objects will be found capable of being thus taken.

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[*] *Photographische Correspondenz.*

In 1870 M. Ducos du Hauron, in his treatise, "Les Coleurs en Photographie, et en particulier l'Héliochromie au Charbon," described an effective method of fixing rays of light of any colour on the sensitive film. This method depended on the discovery that the same silver salts which, up to the present, have rendered such signal services to photography, are, under other circumstances, equally sensitive to the yellow and red rays; for if the iodine and bromine salts are brought into combination with an organic body (such as albumen, gelatine, gum, sugar, &c.), so that in the sensitive film there are formed combinations of silver, not only with the halogens, but also with an organic radical, then the scarcely visible image bears the impression of all the rays, in the correct proportion to their intensities, and can be intensified to the required point. According to M. Ducos, the success of this operation depends principally on the intensifying of an image already visible, and not on the development of one that is latent. The collodion for this process is prepared after the following formula:—

Gun-cotton	1·2 grams
Cadmium iodide	1·2 ,,
Cadmium bromide	1·2 ,,
Ether	60 cub. cents.
Alcohol	40 ,,

It should be as dense as possible, in order to take up a large quantity of silver salt, which would increase its sensitiveness. For the same reason it should be poured slowly over the plate, and must be sensitized in the following bath:—

Distilled water	100 cub. cents.
Silver nitrate	8 to 10 grams
Citric acid	2 decigrams.

The plate is left in the bath for three minutes, and afterwards plunged for five minutes in a trough of distilled water, in which a large number of plates can be washed at the same time. It is then taken out, drained, and covered with the following solution:—

Albumen	100 cub. cents.
Sodium iodide	5 decigrams
Sodium bromide	5 ,,
Sugar	8 ,,

A portion of this solution is poured on the plate and drained off again, and the operation repeated three times, with the difference that the last time a larger quantity of the solution must be employed, and then allowed to run off into a separate vessel. This is used for pouring on other plates the first and second time. The plate is then dried in a vertical position. On the same, or on the next day, it is sensitized, immediately before using, in the following solution:—

Distilled water	100 c. c.
Silver nitrate	10 grams
Citric acid	3 decigrams

This bath produces an organic compound of silver which renders the film sensitive in a proper degree to all the rays. After a minute the plate is taken out and drained; it can be at once dried, or first washed *once* with rain water, so that all the silver nitrate cannot be washed away. After drying it is submitted in a fuming box to ammonia fumes, and exposed either in the camera or under a coloured glass picture.

(To be continued.)

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ON THE PHOTO-CHEMICAL PROPERTIES OF SILVER-IODIDE.

BY DR. J. SCHNAUSS.*

At the time (now long ago) when sun pictures, produced on silver plates by means of iodo-bromine vapours, and developed by the vapour of mercury, were exciting universal surprise, the general and natural desire for these Daguerreotypes, as they were called, to be capable of multiplication remained unsatisfied. Various attempts to secure impressions from them, either by etching or by some other method, and more especially by electro-deposit, led to no satisfactory results. Electro-prints in gilt were very pretty, but, on account of equality of tone, could only approximately reproduce the beauties of the original. In my chemico-physical laboratory I occupied myself much with attempts of this kind in electrotyping, and can even now recall with a smile how a travelling Daguerreotyper from Berlin, who was plying his art in this neighbourhood, applied to me, and obtained, with delight, the first electro-prints of his pictures; further, how he pompously announced in the local papers that he was prepared to produce any required number of prints of his Daguerreotypes, and how he exhibited specimens of them in his show-case—both, it is needless to say, without my knowledge.

The silver iodide produced by this dry method was therefore unfruitful, so to speak, and permitted no reproduction of its light impressions. Fox Talbot, so celebrated in photography, and whose loss we have lately had to deplore, was the first to announce that the action of light on silver-iodide obtained in the wet way could be developed; thus he became the founder of modern photography as a reproducing art. Then only he began to understand the production of negative pictures. The iodide obtained as a precipitate was always thought in the time of Talbot to be much less sensitive than the chloride of silver, because the latter was *visibly* altered under the influence of light. On the other hand, when the iodide is exposed, a peculiar chemico-physical change of its molecules takes place, which is invisible to the eye, but is manifested by the use of the developer. It will be the object of this treatise to explain as amply as possible this highly interesting process.

First, let us consider the chemical nature of silver-iodide Here we are met by one of its properties which makes us doubt whether, under all circumstances, we have to deal with the same simple compound Ag+I. Besides the dry way—by direct combination, that is, of its two elements (as occurs for instance, in the Daguerreotype)—the silver-iodide can be prepared in the wet way by double decomposition, and in this condition it manifests a materially different behaviour to light according to the method of its precipitation. A difference also is observed at the first glance in the colour, and generally in the physical condition of the precipitate, according as an excess of the alkaline iodide salt or of the silver nitrate is present in the precipitate. Probably, in consequence of the solubility of silver-iodide in alkaline iodide, the former exhibits rather a yellowish-white colour, and remains longer suspended when a smaller quantity of the former is present, whereas with an excess of silver nitrate it is of a light lemon colour, and is thrown down quickly. Of much more consequence is the different action of light upon these two precipitates of silver-iodide As it is our present object to inquire into the nature of the invisible image, we shall not now discuss the behaviour of silver-iodide in both the above modifications after direct and long-continued exposure,† but confine ourselves to the effect produced by the developer on the iodide, in which, after a comparatively short exposure, we can detect no immediate alteration—that is to say, in respect of colour. And here we notice that the silver iodide obtained with an excess of alkaline iodide is unaffected, even after considerable exposure; whereas in the other modification it is almost instantaneously acted on by light. This phenomenon, which is of so much importance in photography, is explained by the traces of silver nitrate found still adhering to the precipitate of silver-iodide, even after long-continued washing. In the absence of the former, the development of an invisible image on the layer of silver-iodide

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[*] *Photographisches Wochenblatt.*

[†] According to Claudet the illumination of a film of silver iodide must be three thousand times as strong to produce the same effect directly as it ould with the help of the developer.

(not to be confounded, however, with the alkaline development of silver bromide) is scarcely conceivable. A chemical combination is formed of silver nitrate and silver iodide, in which the ratio of the amount of the two substances varies with the manner of its preparation. For this combination I have adopted the formula $AgI + AgNO_3$ (old notation—$AgI + AgO,NO_5$) ; it is obtained by dissolving as much newly precipitated silver iodide as possible in a hot saturated solution of silver nitrate, and crystallizing out. It decomposes quickly in sunlight, a property which Sutton regarded as inexplicable, because a silvered film of iodized collodion loses all its sensitiveness in drying. So far as the bringing out and development were concerned, he was right, for by the crystallization of the silver nitrate (in the shape of small needles), the homogeneity of the film is quite destroyed; but it is nevertheless a fact that this oxy-haloid double salt is extremely sensitive. The most elegant method of obtaining the combination is by double decomposition. Pure lead-iodide is dissolved in the least possible quantity of a hot and concentrated solution of silver nitrate, and, on cooling, the double salt separates in beautiful acicular crystals.

This compound substance is immediately decomposed by contact with water. If one of the crystals be thrown into distilled water it at once turns yellow, showing that on the surface the silver nitrate has been dissolved, and the iodide separated. Internally the double salt, being protected by the film of insoluble iodide, keeps for a long time undecomposed, until the crystal falls to pieces or is crushed. Owing to the infinite subdivision of chemical molecules, molecules of $AgNO_3$ combined with AgI will, notwithstanding the repeated washings, be contained in the interior of the molecules of iodide; and in this way is explained the sensitiveness, or rather the capability for development, of silver iodide precipitated from an excess of nitrate.

More particularly in the dry process is this explanation confirmed. Long continued washing does not destroy the sensitiveness of the film, though this is at once effected by a bath of alkaline iodide or bromide; for the still remaining molecules of silver nitrate are more easily decomposed by the chemical action of such a solution than they can be dissolved by the water, which has to penetrate the surrounding coating of silver iodide. Hence we are not surprised at an observation lately made by Mr. W. H. Sherman, that even a plate which has been exposed can be restored to its original condition by a bath of this kind with the addition of a little nitric acid. By the aid of this expedient, says Sherman (*Photographische Mittheilungen*, 1877, p. 183), plates can be prepared with emulsions in daylight.

The formula for such a bath (called a restoring bath) for wet plates is as follows:—

Potassium iodide	8 grams
Potassium bromide	11·2 ,,
Water	288 ,,
Nitric acid	24 ,,

The latter acid plays, to a certain extent, also a part, inasmuch as it removes, even after development has taken place, every trace of metallic silver, and therefore destroys the picture. But before the sensitiveness can be restored the acid must be neutralized by an alkaline carbonate; the only question is, whether by thus again removing the alkaline reaction, necessary as it may be, we are not moving in a circle.

According to Professor Vogel, the property which silver-nitrate possesses of sensitizing the iodide depends on the fact that the former easily absorbs iodine; according to this analogy there are a number of other substances having the power of absorbing iodine, which are also good sensitizers—for example, tannin and gallic acid. But in this case it depends whether the silver iodide be developed, or merely be examined with reference to direct exposure, and also whether it be wet or dry, as in the dry plate process; in the latter condition a substance which absorbs iodine (as pyrogallic acid) often acts injuriously on the sensitiveness. (*To be continued.*)

PRACTICAL FERROTYPE PROCESS.

BY E. M. ESTABROOK.*

THE ferrotype has been the popular picture for a number of years, and I see no reason why that popularity should decrease; but many arguments may be deduced from the past and present to prove an increase in the demand for this style of pictures, and it becomes the duty of the ferrotypist to keep up with the requirements of the public.

The light is of the first importance, after which the chemicals, by which I mean the collodion, the silver bath, and the developing solution. The formula for collodion, as here given, will be found to work well and quickly under almost any kind of a light.

Sulphuric ether	10 ounces
Photographic alcohol	10 ,,
Gun-cotton	120 grains.

Then add—

Iodide of ammonium	80 grains
Iodide of cadmium	40 ,,
Bromide of cadium	40 ,,

This collodion can be used as soon as it has settled; it makes a strong, smooth film, gives fine gradations of tone and great brilliancy, and should be used with a silver bath of from forty-five to fifty grains to the ounce of water. In making a new bath take the whole amount of water to be used, and add a few grains of nitrate of silver, and set in the sunlight until it has turned reddish dark, and clear again, being careful to have no acid of any kind in the water when placed in the light. After it has become clear, filter, add the amount of silver necessary, and also, from a half to one grain of iodide of potassium, according to amount of bath. This bath will work satisfactorily at first, without acid; after a while a few drops of nitric acid may be added if necessary. After long use, if your bath coats the plate slowly, and the developer is found to flow unevenly, it will be necessary to boil it, in order to evaporate the ether and alcohol it collects from the plates. It will be sufficient to boil in a porcelain dish to half the quantity, having first neutralized with carbonate of soda; after boiling, add water to reduce to proper strength, and set in the sun until clear. If, after constant use, you find a rough grain on the surface of the plate when taken from the bath, as if fine sand had been scattered over it, producing fine black specks over the surfaces of the developed pictures, it is the result of an excess of iodide in the bath more than the solution can hold, and is, therefore, called free iodide. It will be necessary to add fresh silver and water to take it up, or to add water in order to set free more of the iodide; filter carefully, and then boil to bring to proper strength.

The developing solution, costing less than the other important chemicals, is, in most galleries, very wastefully used, when, by developing over a large funnel or tray, and filtering, at least three hundred per cent. might be saved, and a better article had. My plan is:—To 64 ounces of water add 4 ounces proto. of iron, 4 ounces of acetic acid. From 1 to 4 ounces alcohol, as works best.

Before using, put into your pouring bottle or dish a very small quantity of tannin; this fill up with developing solution. The tannin must be in minute quantity, and in action retards the iron slightly, giving clearer and purer whites and better definitions. I have always developed over a large funnel, allowing the solution to filter through into a large bottle. In using again I take three-quarters of the old to a quarter new. I find that by varying the proportion, very desirable modifications may be produced in its action on the sensitized and exposed plate. Having developed my plate I fix it in a strong solution of cyanide of potass., which I keep in a bath-holder the same size as my silver bath, thus avoiding the deleterious fumes resulting from evaporation, &c.

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* *The Photographic Rays of Light.*

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PERMANENCY IN PIGMENT PRINTS.

Dr. Van Monckhoven's paper, read before the Photographic Society on Tuesday evening, introduced some startling propositions for the consideration of all interested in photographic pigment printing. He practically asserts that pigment printing has hitherto been based upon a false theory, and that the majority, if not all, the pigment prints hitherto produced will fade. He alleges that the action of light on bichromate salts has not been understood, and that the real result of this action of light is the production of a yellow salt which *is itself sensitive to light*, causing the fading of the print whenever organic colours such as alizarine, madder, indigo, cochineal, or similar colours are present. Now as in almost every case where a carbon print presents any tint of the colour known as "photographic purple," some of these colours have been used, if the theory now put forward be received, all these pictures must be expected to fade. That pigment prints prepared with fugitive colours should fade has already been shown, and where carmine has been employed to give the rosy hue, many cases have occurred where change has been only too manifest. But it has been very naturally held, that where permanent pigments like the madders were employed to give a rosy tint to the carbon blacks, no danger of instability was incurred. Dr. Monckhoven steps in, however, to disturb this serene confidence.

Where a vital and a comforting faith has to be disturbed, the new doctrine which assumes the error of the old must expect to be boldly challenged and closely scrutinised. The process of uprooting a faith is one involving serious issues. Notwithstanding the accumulated evidences of the instability of silver printing, there are thousands who to this day cling to it with a loving tenacity. And there are thousands more who reluctantly gave up silver for carbon, being simply compelled by the overwhelming evidence. But these and others, if they are now asked to give up their faith in carbon printing, which they have regarded as beyond question or doubt as to permanence, will be tempted to abandon confidence altogether, and accept the faithless dogma of indifference and unbelief, exclaiming, "There's nothing new, and nothing true, and it does not signify?" It is true Dr. Monckhoven offers a substitute for which he claims confidence, at the same time he denounces the basis of faith hitherto adopted. But the uncertain student who has been cut adrift from his moorings is not ready to accept the new-comer, but exclaims, in the words of Edgar Allan Poe—

> "On the morrow he will leave me, as my hopes have flown before!"

"Besides," adds the disappointed student, with a touch of cynicism, "this new-comer is an interested party: he has an interest in condemning the old carbon theory, and in presenting himself as a trustworthy substitute." Dr. Van Monckhoven has been long and favourably known to photographers as an enthusiastic scientific photographer, who has of late years given much attention to carbon, and many will hail with satisfaction the fact that the result of his study and experiment is about to be placed at the service of photographers in the manufacture of tissue for general use. Believing that a mistaken theory has been accepted hitherto, and untrustworthy organic materials used in carbon printing, he has also discovered that oxide of iron, which can be prepared in a transparent form, can be employed with advantage to replace the pigments hitherto used, avoiding the risk of fading involved, as he believes, in the theory he states, and at the same time yielding a rich, warm, and satisfactory colour. If the elements of danger which he points out be found on further experiment to exist, he confers a large benefit by calling attention to it. If further experience in varied hands do not verify his discovery, the investigation will only place pigment printing on a sounder basis still. In any case, Dr. Van Monckhoven gives to the world, unreservedly, the result of his researches.

Dr. Monckhoven comes fortified by something more than assertion. We have before us examples of prints produced on Autotype tissue prepared with alizarine, and on the doctor's own tissue prepared with an iron salt. They both possess, at the outset, a rich warm, purple brown tint, similar to that obtained by successful gold toning with silver prints. A mask having been placed so as to cover portions of the print in each kind, they have then been exposed to sunlight. On removing the mask it is apparent that the exposed portion of the Autotype has somewhat changed colour, whilst the similarly exposed portion of the print produced on Dr. Monckhoven's tissue is unchanged. The change in one, and the stability in the other, is beyond question. But assuming, for a moment, the position of counsel for the defence of the old method, we interpose a few considerations in arrest of judgment. In the first place, there is no evidence, in regard to the prints on Autotype tissue, as to how the tissue was prepared. It is not stated whether it was prepared by Dr. Van Monckhoven after an assumed Autotype formula, or prepared by the Autotype Company in the ordinary way of trade. It may have had added to it carmine to give warmth and rosiness to the colour. And, indeed, the effect is very suggestive of this. The change which has been effected by exposure to sunlight is a loss of rosiness, leaving the print of a rich warm deep brown, without the rosiness which is often the especial effect of the use of carmine in the tissue. If any trace of carmine were used in preparing the tissue, the effect is just what might have been predicated. In the specification of Mr. Johnson's recent patent for improvements in carbon tissue, he affirms that fugitive preparations of cochineal have hitherto been used to secure brilliant warm tones in carbon tissue, and states that the use of alizarine has not hitherto been possible. Few people should know better than Mr. Johnson what has been used in preparing carbon tissue, and he would scarcely go to the trouble and expense of patenting a mode of using alizarine as a permanent pigment, if its employment were already easy and familiar. It is possible that Dr. Monckhoven has been assuming the presence of alizarine in a piece of tissue which really contained cochineal, and, hence, naturally changed in sunlight.

At any rate, we are safe in repeating what we have often before stated, that a bona fide carbon print is quite safe. We have many old examples in our possession, some which have been framed and hung for many years, which show no trace of change of any kind. They are amongst the earliest examples produced by Mr. Swan, and are of a rich engraving black, apparently consisting of Indian ink or lamp-black solely. There has been of late years gradually growing a tendency to produce carbon prints as closely resembling gold-toned silver prints as possible. Some time ago a correspondent in our columns offered a protest against this, and we must confess a strong disposition to agree with his position. The photographic purple is not, we think, by any means the best pictorial colour. Sepia, bistre, or black, are time-honoured monochrome tints amongst artists and lovers of art, and are, we think, better in all respects than the rosy purple of good gold toning. The carbon printer has sepia and black for his monochrome, and certainly does not need carmine, although it helps the picture to glow charmingly. An example printed on Mr. Johnson's new tissue with alizarine has been laid in daylight on our desk now for some months without any trace of change, and since receiving the examples from Dr. Van Monckhoven we have placed one partially masked in full sunlight. It has not yet had more than a few days' exposure, but no change is apparent.

It is by the result of practical experiment that photographers will be best satisfied; but theoretical considerations are full of interest. Let us glance for a moment at Dr. Van Monckhoven's proposition. He says that the accepted theory is that light acting on the bichromated tissue reduces the bichromate to a sesqui-oxide, but that he finds this is not so; light really reduces the bichromate to a yellow salt which is not removed by hot water, but is dissolved by bi-sulphite of soda; and that this yellow salt is still sensitive to light, and causes fading when organic pigments are present. Even stable organic colours, he says, become fugitive under these conditions. With every feeling of esteem for Dr. Van Monckhoven's opinion, we scarcely think his estimate of the existing theory of carbon printing is exact. Many theories have been held since the earliest discoveries of the photographic qualities of the chromic salts, and, as we have more than once recently intimated, much uncertainty seemed to prevail until the present day. In a work issued upwards of ten years ago, on pigment printing, we expressed an opinion on the subject which has not, we think, since been shown to be erroneous. It was there pointed out that the action of light in the bichromate was to produce not a sesqui-oxide of chromium $(Cr2O_3)$, but a brownish-yellow salt which was a chromate of chromium, $Cr\,O_2$, and this chromate of chromium, when immersed in water, was decomposed into chromic acid and sesqui-oxide of chromium, the pale green insoluble salt which, in combination with the gelatine rendered insoluble by it, held entangled the pigment form of the image. An experiment to watch the operations is best made without a pigmented tissue. A piece of paper coated with gelatine and bichromate exposed under a negative gives a brownish yellow image. If this print be slightly washed to remove excess of unaltered bichromate, it will last for some time, but the image gradually grows fainter. If, however, in the first instance, it be thoroughly washed, it begins to lose its yellow or brown tint, apparently washing out altogether. In the end there is nothing left but a tint of a pale greyish green, and this, so far as we have seen, does not change in the light, but remains permanent. This is the basis of the carbon picture. Its chief drawback is the green tint, which tends to injure the tone of the print, and has rendered necessary the various additions to carbon to give rosy warmth in place of a sickly green coldness in the blacks of the print.

Assuming the theory we have stated to be correct, the probabilty of fading to which Dr. Van Monckhoven refers does not seem apparent. He says that the yellow image produced by light on the chromated tissue, being sensitive to light, causes fading of the image when even permanent, organic colours are present; but if this unstable yellow image first produced by the action of light on the sensitive tissue be removed by development and washing, and the only chromic compound left is the insoluble, and presumably, inert, green oxide of chromium, there appears little danger to the pigment bound up in the gelatine side by side with the sesqui-oxide. We do not care, however, to dwell further upon theoretic considerations at present. The subject will doubtless at once engage the attention of many of the best chemists engaged in photographic experiment; and will, as we have said, be eventually decided by practical issues.

A glance, in parting, at the most interesting part of Dr. Van Monckhoven's communication, involving some new and interesting principles, and promising a new process altogether. He has discovered that bichromate is not necessary to sensitize the tissue. If tissue be immersed in a solution of ammonio-citrate of peroxide of iron, dried, exposed, and then immersed in a solution of bichromate or bichloride of mercury, or some other salts, and at once transferred and developed, a picture is produced. Based upon this discovery he hopes shortly to offer to photographers a permanent sensitive tissue which will keep for years. We refer the reader for further interesting details to Dr. Van Monckhoven's paper, which will appear in our next.

THE "GRAPHIC PORTRAIT."

We always look with favour on the introduction of novelties in portraiture as a boon to professional photographers, tending to stimulate business, and reacting favourably all round, on the public, the photographer, and the manufacturer of photographic materials. We have received some examples from Mr. A. Ford Smith, of Llandudno, of the "Graphic Portrait," in cabinet and card sizes. These consist of portraits with backgrounds produced by double printing. The addition of various kinds of backgrounds from separate negatives is not, of course, a novelty. The novelty here consists chiefly in—besides fresh and novel designs—the simple facilities provided for effecting the work. The background negatives are wax paper negatives produced by Mr. Smith, who is prepared to distribute them to photographers with very simple instructions for working, at a remarkably reasonable rate, a complete set of fifteen cabinets and fifteen card negatives, being supplied for £1 10s. 6d., Messrs. Marion and Co. having undertaken the distribution to photographers. Amongst the examples before us are many at once simple and excellent. Some consist of a neatly stippled background, and some of a bold, light, sketchy, hatched finish for the lower portion of a vignette. Some consist of a floral surrounding, and others of picture-frame designs. There is great variety and great excellence and facility for giving impetus to business by novelty in many establishments.

BALANCE AND VARIETY.

BY WM. HEIGHWAY.

There is always a very great danger, in laying down rules, that the student will regard them at too high value, and stick to them so closely that originality will be cramped. I reiterate this fear and caution; the danger being a very present one, and the consequences fatal to art study.

The benefit the knowledge of the rules of composition confers on you is, that your mind is trained to select the picturesque aspect of your subject with ease and certainty, and to know why one view is more artistic than another.

When you are capable of analysing the cause of the sympathetic and beautiful effect of a picture, you will generally be able to assign the reason of your pleasure to the obedience to the rules of harmonious composition manifest in the picture exciting this feeling—and a sense of disquiet where the rules of composition have been outraged.

Let us, then, proceed to the consideration of these rules.

Balance of lines, and balance of light and dark, may almost be said to take first place among the rules of art, because if in these particulars a picture has gone wrong, no beauty in other respects (if it were possible there could be any) can redeem it or compensate for the faults in this the very keystone of the structure.

All lines must be balanced or compensated—for the very sake of the stability of the picture, must they; failing this balance, a painful tumble-down appearance is perceptible, and your picture will look for all the world as if, weary of itself and your blunders, it were about to fall to pieces.

The weakness and awkwardness of lines all running in one direction is apparent to every one who has eyes to see; a sense of falling is given, but the introduction of lines of opposite direction at once restores balance.

Balance is to be secured in many ways, nor should it be necessary for me here to enter into the subject more than suggestively.

(If it is, I'm sorry; for space won't allow me much chance of showing off the art-treatise style).

In the portrait, lines of balance are to be secured in the direction of the head, the pose and view of the shoulders, the arms, the drapery (and, if necessary of introduction), the "accessories."

It will be noticed that I say in the mention of the accessory, if necessary of introduction—well, I mean that very much. Though not belonging here, I will say, don't introduce accessories into a portrait *unless they are necessary, and, then*, DON'T IF YOU CAN POSSIBLY HELP IT!

First see to the shape of the whole thing. Examine the outline, for if that is wrong, what matters it how correct the inside drawing, how beautiful the lines and folds of drapery, or how carefully all the detail has been arranged? Indeed, all the excellence of the picture will but make more apparent the one great blot.

Keep in view the *motive* of your picture. Don't have more than one movement in a figure—(Ah! you thought there should be *no movement in a photograph?* But I don't mean that movement of the sitter which drives you wild, and necessitates the preparation of another plate! I speak of the life, the soul, *the story* of the picture.)

Simple lines, and simple, honest lights and shadows. Nothing patchy.

Keep things in their right places, and let all your effects be plain and straightforward, without any nonsense.

All this seems antagonistic to Variety—but it isn't. Variety is a necessity of composition, and true laws never clash. One may seem to modify another, and often this is so, but never to contradict or kill.

It does not need any very eloquent enforcement of the axiom that Variety is a most useful—nay, more—necessary quality in a picture. Without it, how tame would be the effect (if there happened to be any *effect* at all), and how unhappy composition is ever without the judicious use of this quality!

The great danger, however, to the artist who is blessed with picturesqueness is, that he is liable to be led away into an extreme, which (as extremes always are) is exceedingly painful.

But the rules of composition provide antidotes for this fault. The sense of harmony, already considered, repetition, simplicity, and repose, which will anon have our attention, keep this love of variety from running riot.

Composition, in fact, teaches us the proper use of variety. This quality, like all others, must be subordinated and properly used, if, from being a most useful servant, it is not to become a tyrannical master.

Of more service to the conscientious student than many articles on art, will be found the careful study of the works of the great painters. Better than anything else are the prints from their works, because in them we are not confused by the colour, of which at the present stage of photography the less we consider the better.

One of the chief sources of beauty and picturesqueness is variety. It idealizes the real and casts the wondrous spell of poetry over the common-place, even in much-despised photography.

It is one of the chief characteristics of beauty and symmetry; it is, too, a necessary in the production of the picturesque—yet for all this it must be kept well in hand or variety will be the death of you.

Having said a good deal in favour of variety, we will consider its antidotes—in the next chapter.

ZINCOGRAPHY AS APPLIED TO TYPOGRAPHICAL PRINTING.

BY E. A. NUTH.*

Zincography, *per se*, is precisely similar to lithography, both in the manipulation and the results, the only difference being the substituting of a zinc plate for the litho stone. This is found to be very economical, as the original cost of the zinc is from one-sixth to one-tenth the cost of the stone. They also give a great number of impressions, and are very portable, a large stock of zinc plates (say, 1,000 to 1,500) being easily stowed away between a few shelves, while the same of stones would require several rooms for their accommodation. This is the process that until lately has been exclusively used for the production of the Ordnance Survey maps at the Government offices at Southampton.

But the process of printing (being identical with lithography) is rather tedious, and, of course, each illustration must be on a separate sheet, and cannot be included in a page of type. It is well known to every tyro that the process of lithography depends on the fact that a greasy ink repels water, and *vice versa*, and that if a design in such an ink is drawn or "laid" on a porous stone or zinc plate, and damp sponge passed over it, the water will be repelled from the lines of the drawing, and will only rest on the bare surfaces; then when a roller charged with ink is passed over the plate the ink is only retained where the greasy design is, and is effectually repelled from the clear spaces by the water contained thereon. Bearing these simple facts in view, about five and twenty years ago a Mons. Gillot, of Paris, endeavoured to engrave a zinc plate by means of etching it with an acid, rightly supposing that the acid, like water, would not touch the ink, and would only attack the bare metal. Naturally the crude idea required working out, and for some years the process was considered a failure; but *perseverantia vincit omnia*, and ultimately it was completed and patented in France under the name of *paniconographie* (from the Greek *pan* all, *eikon* image, *grapho* to engrave). It has already struck a serious blow at the wood-engraver's trade, and even the lithographers regard it with dislike as approaching dangerously near their territory, and there is not much doubt but that it will eventually oust both of these from the field.

The artist may draw his designs either on transfer paper or stone, as suits him best, and it can be thence "laid" directly on the prepared polished zinc plate.

A most useful and novel feature has been introduced of late years—namely, that of photographing the original to be copied on to the zinc, thus affording a cheap method of obtaining, on any scale of enlargement or reduction, facsimiles of old engravings, rare maps, autograph letters, &c., reproducing each detail with a precision the draughtsman would be utterly unable to do.

A negative of the subject is first taken in the ordinary way with the camera. A zinc plate is then coated with a solution of bichromatised gelatine and dried in the dark, after which it is exposed to light under the negative until the exposed parts have become brown and insoluble; it is then covered with a film of lithographic ink, and placed to soak in cold water, which only dissolves out the parts that have been protected from the hardening effects of the light by the blacks of the negative, thus leaving the required design on the plate. The plate, however prepared, is engraved by being immersed for some hours in a bath of dilute acid kept in a state of continual agitation; it is then "bitten" in successive stages, until a sufficient depth is obtained (proper precautions being taken to prevent under-biting and "burning," or thinning of the lines). It is then trimmed round, and mounted on a wood block, and is ready for use, and may be set up in a form with type, &c.

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* *English Mechanic.*

In England it is known by the name of "Leitch's Process." The process is a very rapid one, and as a zinc plate wears about four times as long as a wood block, and costs from about one-fourth to one-sixth as much, it may well be seen that they are very economical in use. When required for colour printing they can be brass-faced by electro deposition, by which means the colour is given off with a richer tone. There are only three or four London houses where it is worked, but it is being rapidly introduced both into the provinces and also into Scotland, where it is highly appreciated.

Correspondence.

THE NATURE OF LIGHT.

Dear Sir,—Speculative philosophy is usually a potent provocative of intolerant conceptions; for this reason I deem it advisable to affirm that in the views I am about to enunciate I am not in quest of a polemical victory, nor have I any discourteous intentions in my reply to Mr. Reynolds' letter, and the arguments therein contained, in support of what appears to me an indefensible case.

As regards the rival theories of Brewster and Young, I gave preference to the views of the former—1st, because they agree with the results practically obtained by Professor Hunt in his singularly interesting experiments with coloured light on the development of plant growth; 2nd, on account of the difficulty of communicating thoughts except the explanation is given in words that are connected with familiar associations, which recognized, suggest the idea I wished to convey. If the three qualities common to solar light—viz., heat, light, and actinism—can be identified without reference to colour, the theories of scientists respecting chromatic divisions of the spectrum are subjects of indifference to me.

Revolving discs are pet examples employed by lecturers on optics as proofs of the chromatically combined nature of solar light. They are pretty toys, certainly; I am nevertheless surprised that eminent scientific men have not long since discovered the test to be valueless, and to constitute an optical illusion literally incapable of demonstrating the nature of light. A square-shaped body revolving at a rapid rate assumes the figure of a circle; a jagged surface appears perfect and smooth; and a black object changes its natural tint for a lighter and neutral colour. Why? Simply because the circular motion is continuous, and affords no interval of rest, without which it is impossible for a true transcript of a figure to be portrayed on the retina, and from thence conveyed to the sensorium, where it becomes associated with the mind. This explanation with double force applies to a revolving card-board disc, which, divided into sectors, would show similar effects, whether coloured in all the tints of the solar spectra, or painted alternately yellow and blue; for whilst rapidly rotating, the colours would cross and recross, intersecting each other at intervals too brief for the excitation of the nerves of vision by any distinct colour. The result, as seen, would be a neutral tint (not a pure white), except that one colour should be made to predominate by extra breadth of space or ascendant intensity; in such case the face of the disc would appear tinged with the brighter or most widely spread hue. I have noticed similar effects to those shown by a whirling disc when looking through an eye-piece of low power, on a piece of blue glass fixed on the field of a microscope, and intercepting the light beneath by transmitting it through glasses of various colours.

The lantern experiments alluded to by Mr. Reynolds are exceedingly interesting. I shall embrace an early opportunity of repeating them, with numerous additions which occur to my mind. Pending this test, however, I might here observe that as colour, transmitted or reflected by stained glass, would in each case be in wave force identical, and seeing the sensation of yellow and blue differ in the rapidity of their cause—undulations, these, on being mingled together, would neutralise each other, and neither tint would appear on the screen. For similar reasons red and green rays might form yellow; as one might interrupt, yet harmoniously blend with the others, to produce the "reflected" wave force necessary to convey the sensation of yellow to the eye.

Respecting Mr. Reynolds' remarks on the mixing of colours, they to some extent appear to prove the solitary example he cites; but can they account for the reason of colourless fluids when mingled together forming brilliant colours—for instance, red, yellow, and blue—the former two by mixing iodide of potassium with solutions of bichloride of mercury and acetate of lead, the latter by adding liquid ammonia to a weak solution of sulphate of copper? The theory which supposes colour to be a result of wave force operating upon the nerves attached to the eye readily suggests a reason for anything that is connected with the appearance and production of colour. Mr. Reynolds errs in good company in the roundabout course he prefers to find reasons for natural phenomena. As far as I am concerned, I cannot accept ponderous explanations when a shorter cut can be taken to the mark.—Yours truly,

W. T. Bovey.

2, St. Ann's Villas, Avenue Road, Acton, W.

STUDIO HINTS.

Sir,—Under the above heading, there appeared in your last issue the following, at p. 110, par. 3, first line: "Instead of flowing the plates with albumen, I use what is called the Mansard brush," and then follows a description of the article (Mansard brush) in the directions given for its construction, from which it plainly appears that the aforesaid brush is none other than our old friend the "Blanchard brush," one of which, for the same purpose as our American brother has specified in his hints, I have used for a considerable time. Doubtless unaware of the fact that the principle involved in so useful an article is precisely the same as that made known to the profession years ago by Mr. Blanchard, our Transatlantic brother need only be told that "Blanchard," and not "Mansard," is the correct designation.—I am, yours truly, J. Kay.

Proceedings of Societies.

Photographic Society of Great Britain.

The usual monthly meeting of this Society was held in the Water-Colour Gallery, 5, Pall Mall East, on the evening of Tuesday, the 12th instant, Mr. J. Glaisher, F.R.S., in the chair.

The minutes of a previous meeting having been read and confirmed,

The Chairman announced that the Council had re-elected Mr. H. Baden Pritchard as honorary secretary.

The Chairman then read a letter from Mr. Joseph Paget offering a prize of £50 for the best dry-plate process, and stated that the Council had appointed a committee to draw up conditions and make arrangements for the competition.

Captain Abney, F.R.S., then read a paper by Dr. Van Monckhoven, on "Fading in Carbon Prints, and a New Process, Suppressing the Use of Bichromates in Pigment Printing." A number of specimens illustrating the statements in the paper were handed round.

Mr. Walter Bird, in response to a call from the Chairman, said that before many remarks could be made on the paper, the experiments detailed would require repeating and verifying. He might call attention to a large number of old prints they (the Autotype Company) had sent in for the examination of members: none of them were less than two years old, and most of them more, and no change had taken place.

Mr. Sawyer, being appealed to by the Chairman, remarked that experiments could be conducted in two ways. There were various modes of preparing alizarine. He could simply say that in their hands, so far as reasonable tests could, in a comparatively short time, indicate, they had no reason to fear the instability Dr. Monckhoven suggested. They had consulted competent authorities, and subjected the pigment to severe tests, and they had reason to believe they had used none which was not absolutely permanent. Dr. Monckhoven's tests must be repeated and verified, for it must be borne in mind that his experience in making tissue was not a very lengthened one, and, although every respect might be felt for his scientific opinion, this matter must be determined by practical results. The old pictures which were now before members showed no signs of fading, in the usual acceptation of the word. In one sense, probably, everything faded. A painted street door, a sheet of paper, everything underwent a change. The great consideration was to secure pictures liable to the least possible change. If Dr. Monckhoven's discovery proved correct, it would be of great advantage to manufacturers of tissue.

Mr. Hughes said this subject must be examined on its merits, and kept as far apart as possible from trade considerations and the possible jealousies or interests of tissue makers. There had been a great deal of talk about the fading of carbon prints, and some of it of a foolish and thoughtless character. It must be remembered that the permanency of a print formed of a pigment bound up in insoluble gelatine must depend on the stability of the pigment. If a fugitive pigment were used the picture could not be permanent. He had before mentioned an experiment in which silver prints and carbon prints were exposed for ten months to sunlight and moisture. The silver print presented a sorry effect, the lights being the colour of cheese. The carbon prints seemed unchanged, but, in removing them from the frames, the covered edges showed that a little change had taken place in the exposed portions. Whether the change was an injury was a matter of opinion; but they were certainly not spoiled; they had lost the rosy purple which was probably due to cochineal. The great thing required was sufficient stability with ordinary care, and that, he thought, had already been secured. He proceeded to describe a print produced by Mr. Swan in the early days of carbon, which Mr. Wharton Simpson would well remember, as he had something to do with securing it for the South London Society as a presentation print. It was from Mr. Blanchard's negative "The Zealot," and, prizing the picture, he had had it framed and hung up for ten years. He often looked at it, and found no trace of change or fading. He thought Dr. Monckhoven's experiment with paper treated with bichromated gelatine was misleading, as the carbon print was transferred, and had no further connection with the yellow paper.

The Chairman called attention to the old carbon prints on the screens sent by the Autotype Company, and the noble display of the photographs of Mr. Vernon Heath containing his intended contributions to the Paris Exhibition. Mr. Heath had sent them in compliance with a suggestion from himself (the President) to help to cover the walls in the absence of the water-colour pictures recently removed.

The Chairman then suggested an adjournment of the debate on carbon, and its renewal it next month, when members had had time to consider the paper read, and, if necessary, to repeat the experiments.

Mr. E. Cocking read a paper on "Converging Lines in Architectural Photographs." A discussion followed, in which Captain Abney, Mr. Bedford, Mr. Sawyer, Mr. Hughes, Mr. Davis, Mr. Bird, Mr. W. Bedford, Mr. York, Mr. Vernon Heath, and Mr. Cocking, took part. As the discussion would not be interesting without the paper, we delay both until our next.

The Chairman then announced that at the next meeting, which would be held on the 2nd of April, instead of the 9th, the discussion on Dr. Van Monckhoven's paper would be resumed, and that a paper on "Dry Processes," by Mr. England, would be read.

The proceedings then terminated.

South London Photographic Society.

The usual monthly meeting of this Society was held in the Society of Arts on the 7th inst., the Rev. F. F. Statham M.A., president, in the chair.

The minutes of the preceding meeting having been read.

Mr. F. Wratten read his paper "On the Elimination of Soluble Salts from Gelatine Emulsions" (see page 121).

Mr. Kennnet said the method of washing proposed would answer the purpose quite well.

Mr. F. York having alluded to spots on emulsion plates,

Mr. Wratten said that the plates might be prepared so as to be quite free from spots.

Mr. Brooks had been using plates 24 by 18, and never got spots.

Mr. Kennett said that gelatine possessed an advantage over collodion for emulsions, as there were never any spots attendant on its use.

Mr. Samuel Fry had recently made himself acquainted with the method of working collodion emulsion, and found that it would be very useful to him.

Mr. Brooks had not used a silver bath for eighteen months. The emulsion answered for every purpose.

Mr. Bridge described in what way he had made use of emulsion, without ever missing a single plate.

Portraits and views obtained by means of emulsions were exhibited by Mr. William Cobb, Mr. Adkins, and Mr. Bennett, after which, on the motion of the Chairman, a votes of thanks was proposed to Mr. Wratten for his paper.

The meeting then adjourned.

Edinburgh Photographic Society.

An ordinary meeting of this Society was held in 5, St. Andrew Square, on the evening of Wednesday, the 6th instant, the President, Mr. John Lessels, in the chair.

The minutes of a previous meeting were read and approved, and the following gentlemen admitted ordinary members:—Messrs. Yule, R. Pringle, W. Cruickshank, John Morrison, Jun., Wm. Jenkinson, John F. Pillans, John Heggie, C. E. Cowdell, Archibald Craig, R. H. Shaw, and James Stoddart—a number considerably above the average, in response, no doubt, to the appeal of Mr. W. H. Davies at the last popular meeting.

The Corresponding Secretary read a communication from the Rev. H. J. Palmer, "A Resumé of the Gelatino-Bromide Process." He began by saying that he had little that was new to communicate, but that he had responded gladly to the request of the Secretary to communicate the results of his recent experiments. An experience of several years of this excellent process had convinced him that the very rapid emulsions that were at present in vogue were steps in the wrong direction, as great rapidity and reliability did not go hand in hand, the former being obtained at the expense of the latter, while, with an emulsion requiring a comparatively long exposure, the process was most simple and certain of any that he had tried. While, however, thus recommending the use of slow-working emulsions, it must be remembered that the slowest gelatine processes were more rapid than any other form at present in use, and certainly rapid enough for all ordinary requirements. The question of the addition of an organifier has recently been frequently discussed, and his opinion, based on the results of many hundreds of experiments, in which almost every conceivable variety of organic matter had been tried, was that for uniformity and density the introduction of an organifier was absolutely necessary For this purpose he had found beer or sugar superior to anything else, and of the two, the former was probably the better, as the latter was apt to be tacky in a damp atmosphere; but with either, even in our warmest summer weather, there was no difficulty in getting the emulsion to set, if the dish or bottle were placed on a slab of stone. During the last year several modifications had been introduced in the method of removing the soluble salts, but however successful they might be when large quantities of material were to be washed, he thought amateurs would do well to leave them alone, as he was confident they would find cold water sufficient for their purpose. Much, too, had been written about the apparatus supposed to be essential for the successful working of the process, and no doubt many were deterred from giving it a trial in consequence; but no one should be frightened on that score, as although a suitable drying box was a comfort and convenience, the only thing really necessary was a perfectly level plate or shelf on which to lay the plates, after being coated, until the films had set. The drying might be carried on anywhere where there was plenty of fresh air and no dust, but his experience led him to believe that freedom from blistering was always secured by drying at a high temperature. His method of washing the emulsion was both simple and efficient. After the addition of the silver to the gelatine and bromide solution, it was kept fluid for four hours—an infant's food-warmer answering the purpose admirably—and then poured into a dish to set. After setting, it was placed in a pail of water and left there till morning, when every trace of the soluble nitrates would be removed. The swollen gelatinous pellicle was then placed in a bottle, and beer added to make up the original bulk, dissolved, and filtered through a suitable medium, and it was ready for use.

In making the sensitive films, with which he has met with much success, he prepared an emulsion weaker in silver bromide, and containing ox-gall. This is poured on in the ordinary way, and the plate laid on the levelling stand, and an additional supply of emulsion poured on to the thickness of an eighth of an inch When set, it is thoroughly dried, and on a knife being passed round the edges, the film is easily removed from the glass. As, however, three ounces of emulsion are required to coat one dozen quarter plates, the method may be objected to on the score of expense, and therefore the following modification is recommended. A solution is made of—

Gelatine	30 grains
Water	7 drachms
Ox-gall	1 ounce

With this an eighth of an inch film is made as before, and allowed to set. It is then sensitised by pouring on an ordinary emulsion, and dried and stript from the glass as before.

There were, of course, several ways in which those films might be supported in the slide during exposure, but he recommended its being temporarily attached to a plate of glass that had received a coat of the following solution—

Gelatine	40 grains
Sugar	20 „
Red dye	sufficient
Water	1 ounce

This remained tacky, and the film adhered to it perfectly, and was removed with ease.

A number of specimens, both on glass and as films, were shown and much admired. Several cardboard slides, and a gelatine film focussing screen, were also exhibited; a description of the method of working them appeared in our issue of last week.

Mr. Davies said the specimens, especially one interior, showed that the process advocated by Mr. Palmer was capable of giving exquisite results; but the films—at least, some of them—were under-exposed, and in several cases there was much halation, but those were not incident to the process, and were easily avoided.

Dr. Nicol said the whole photographic fraternity were deeply indebted to Mr. Palmer for his successful experiments in the production of a substitute for glass as a support for the sensitive film. The search for such a substitute had occupied the attention of many clever experimentalists for years, and many proposals had been made, but with very little success. The films now in the hands of the members were, he thought, the nearest to the solution of the problem that had yet been made—so near, indeed, that he had no doubt that, before the end of the approaching season, Palmer's sensitive sheets would be successfully wrought by most amateur landscape photographers.

Mr. Tunny thought Mr. Palmer deserved the highest praise for the perseverance which had led to such success. Gelatine films had, however, one serious drawback—they were difficult to print, or, rather, they printed slowly, requiring four or five times longer an exposure in the frame than a collodion film. He thought they should be toned to something like the colour of a collodion film after being fixed, which would remedy this evil.

In reference to what had been said about halation, Dr. Thompson remarked that the tendency to that objectionable feature in certain dry plates was much lessened by a full exposure and a consequently short development.

Mr. Bashford next read a paper on "Transparencies," which he said he had been called upon to prepare at a day's notice. Transparencies were, he said, of various kinds, according to the objects for which they were required, and the variety on which he wished to make a few observations was that intended for reproduction or enlargements. In the production of an enlargement, much depends on first getting a suitable negative, and process-mongers had not been slow to search the journals, and extract the good things therefrom, to sell them to unsuspecting photographers, who, in their desire to secure high-class transparencies, become willing victims. He had for some time been in the habit of using a commercial tissue or paper for the production of his transparencies, but, acting on a hint from Dr. Thompson, had turned his attention to a gelatino-bromide, and found it just perfection. It is simplicity itself, very rapid, absolutely structureless, perfectly certain in its results, and beautifully delicate, and altogether free from the faults and defects of the other methods in general use. He regretted he could not give the exact formula by which he had made the several pints now in use, but it was something as follows:—

Gelatine	1 ounce
Water	20 ounces

This is dissolved, and put one half in each of two bottles. To one is added the silver, and to the other the bromide, which should be in excess. The bromide is then poured gradually into the silver with frequent agitation, and the emulsion so formed kept fluid for some hours. When set it is broken up into bits and soaked for several hours in water, then packed into a porcelain colander and placed under the tap, which runs on it all night. After draining, some methylated alcohol is added to abstract more water, and, after draining again, it is dissolved in the usual way by heat, and sufficient alcohol added to bring it up to the original bulk. He had made several pints in this way, and found it admirable. He wished to call special attention to some of the transparencies that were on the table, as probably most of the members might think them too thin; but they were not so—in fact, could not be too thin, provided all the required detail was there. The advantages of a large transparency were not, he thought, generally known, or they would be more frequently made, and work much superior to the hand-made enlargements by public companies, done at home, superior in fidelity and truth, and at less cost. The coating of a plate of any size was a simple affair. Warm the plate, and level it on screws on the work-bench as recommended by Mr. Turnbull. Pour on the emulsion in a large pool, and spread it over the plate with anything handy. Bubbles, lumps, or, indeed, almost anything that is likely to be present, need not be minded, as the whole will immediately settle down into a smooth beautiful film. As soon as set it is placed to dry away from dust. Expose long enough, and develop with alkaline pyro, and any amount of intensity may be got with pyro and silver afterwards. After fixing and drying, it should be coated with matt varnish, and may be then wrought upon if necessary.

A series of very fine transparencies were then shown, and elicited universal approbation.

Mr. W. Neilson was very much pleased with both papers, and was sure, if such could be got for every meeting, it would largely increase the usefulness of even their useful Society. They wanted practical papers, with an exhibition of results, and that was just what they had had to-night.

Mr. Leeich then exhibited a portfolio of very fine photographs of Indian scenery, which were examined with much interest, and after the usual votes of thanks, the meeting adjourned.

From a notice in the billet calling the meeting, we see that each member is to get a presentation print, a copy, by permission of the artist, of Sir Noel Paton's picture entitled "I wonder who lived in there."

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting of this Society was held on Wednesday, 6th inst., not at the usual place of meeting, but at the residence of one of the vice-presidents, Rev. W. J. Whiting. The President, Mr. W. Stoddart, F.R.S., F.G.S., occupied the chair.

The minutes having been read and confirmed,

The President called upon Mr. E. Brightman to read his paper entitled "Whims of a Landscape Photographer."

The President, in remarking on the interesting character of Mr. Brightman's paper, could not help differing from him in regard to his remark as to distilled water. He much doubted the existence of organic matter in it if properly distilled; that is to say, the first eighth of the water that came over should be thrown away. This speaker also preferred alcoholic ammonia one part, rouge one part, water one part, to Mr. Brightman's formula for cleaning plates, having always found it most satisfactory when cleaning microscopic glass. Ammoniacal alcohol, he remarked, differed very much from ammonia, as all liquor ammonia contained a certain degree of tar, which the former did not.

Rev. W. Whiting had generally used a saturated solution of bichromate potash twenty ounces, sulphuric acid one ounce, for cleaning plates, and had found it most certain in its work, the plate being immersed in it. This speaker then, addressing the President, introduced Mr. Keevil, the inventor of the ingenious lantern, and, speaking of the honour he felt at having the inventor of such a scientific piece of apparatus present at the meeting, dilated on some of the chief points of the lantern.

Mr. Keevil then clearly explained its construction and working. The lantern is a single one with a cone and lens in the front in the ordinary form, and another at nearly right angles projecting from one side; the lens in the latter is prismatic in its construction, so that the rays of light are taken up by the lens and reflected at nearly right angles on to the screen, the adjustment for superposing the discs and focussing being most perfect. Quite contrary to the almost matter-of-course prejudice, the light of the prismatic lens—that is, the lens *parallel* to the screen—is, if anything, a little the more powerful of the two.

The automatic arrangement for moving the limelight and dissolving the pictures simultaneously was greatly admired, as was the whole demonstration.

Votes of thanks to Mr. E. Brightman and Mr. Keevil brought the meeting to a close.

Photographers' Benevolent Association.

The Board of Management held their monthly meeting at 160A, Aldersgate Street, on Wednesday, March 6th.

The minutes of the previous meeting were read and confirmed.

An application for relief was then placed before the meeting, and, after full investigation of the case, the relief asked for was granted.

Mr. Lavender proposed, and Mr. Thorne seconded,—"That Mr. Emil Gromann should be elected an ordinary member of the Association."

Grants for various purposes were issued, and, after some general discussion on the business of the Association, the meeting adjourned till Wednesday, April 3rd, at 8 p.m.

Talk in the Studio.

Mr. Gladstone's Photograph.—A curious case was heard on Wednesday week at the Bolton County Court, in which Mr. Currey, a photographer of Bolton, was sued by Mr. Chambers, a law stationer, for the sum of eight guineas for assisting in photographing Mr. W. E. Gladstone, M.P., in his dress as a woodman at Hawarden. Both plaintiff and defendant belong to the Bolton Liberal Association, the members of which made a trip to Hawarden Castle last August, on which occasion they had the opportunity of seeing Mr. Gladstone and his son, Mr. W. H. Gladstone, M.P., tree-felling in the park. On their return to Bolton the plaintiff suggested that the defendant should take a photograph of Mr. Gladstone in his dress as a woodman, with axe in hand. Mr. Gladstone's consent was obtained, and the defendant succeeded in taking about half a dozen negatives. According to the statement of the plaintiff, the defendant promised to reward him handsomely if it turned out a profitable speculation. That it turned out to be so may be inferred from the fact that the London Stereoscopic Company offered defendant £1,000 for the negatives. He declined this offer, and ultimately concluded an arrangement with Mr. Chignall, of the firm of Kirkman and Co., London, for the sale of a half share for the sum of £500, reserving certain rights. The Court held that there had been no contract on the part of the defendant, though there might have been the promise of a present, and a verdict was accordingly given for the defendant with costs. The Stereoscopic Company, in a letter to the *Times*, state that the assertion that they made an offer of £1,000 for the negatives in question is not correct, as they are in possession of a stock of negatives of Mr. Gladstone.

The Electric Light in Photography.—*The Scientific American*, referring to Mr. Vanderweyde's mode of working with the electric light, says:—"Before us is a photographic portrait taken in London by what is known as the Van Der Weyde light. The sitting was had at midnight, a fact which by no means appears in the result. The photograph is more than up to the average standard of excellence, combining a well-defined sharpness of outline with a uniform diffusion of light and shade. Mr. Van Der Weyde, an artist, formerly of New York, after two years of experiment, has succeeded in producing a successful adaptation of the electric light to photography. The light employed is produced by a dynamo-electric machine, with the usual carbon points. The sitter is screened from the direct rays, and receives only those from a parabolic reflector. The rays are made convergent, uniform (and consequently soft and pleasant) by means of a Fresnel lens, which throws an evenly distributed beam over a sufficient space to include the subject. It seems reasonable to believe that the new process is something more than a mere hint, and that it might be successfully applied, with suitable modifications, to all parallel branches of the art."

To Correspondents.

Amateur.—The simplest method of recovering the silver from an old nitrate bath, to forward to the refiner, is to throw it down as a chloride, either by adding common salt or hydrochloric acid. The refiner will reduce the chloride and obtain from it absolutely pure silver. Or you may precipitate the silver as a metallic powder by placing clean plates of copper or of zinc in the solution. The silver in intensifying and developing solutions is generally obtained by adding thereto hyposulphate solutions, and throwing down as a sulphide, to be afterwards reduced by the refiner.

Frank M. Sutcliffe.—The penalty for copying, selling, distributing, or exhibiting a copyright photograph without permission of the owner of the copyright, is £10 for each copy, to be forfeited to the owner of the copyright, together with all copies and negatives. 2. There is no need for a copyright photograph to be marked as "registered." 3. Neither the Post Office, nor, so far as we know, any Government department, ever admit liability for damages of any kind. There is a legal fiction which assumes that the Crown can do no wrong, and, therefore, no Government department can admit liability to compensate a subject.

George Mackie.—We cannot promise you that you can remove silver stains without doing harm to the book; but you may probably considerably improve matters. Make a solution of iodine by dissolving two grains of iodide of potassium and one grain of iodine in one ounce of water. Apply this solution to the stains with a camel's hair-brush. Then apply a solution of cyanide of potassium—say twenty grains to the ounce. Finally, rinse well with clean water, removing it from time to time with clean blotting-paper. This will mend matters—perhaps effect a cure.

Alfred Wells.—An ordinary three-winged clothes-horse makes a good aid to open-air portraiture. Over the centre hang a blanket or other suitable drapery for background, and over the wings, or one of them, white sheets for reflection. Over head it is desirable to extend a sheet to cut off immediate top-light, which makes the hair look grey, and causes deep shadows under the eyes.

C. W.—It is probable that the emulsion treated as you propose would keep well, but there is no such thing as "certainty" in the matter, as the components are acting and reacting upon each other constantly, and producing more or less of change. If tried, it will be desirable to add the preservative so as to form a combination with the sensitive salts in the emulsion, and then wash. It is probable that your proposed mode of working will be successful, but experiment will alone decide with certainty.

George C. Coombes.—We cannot tell you the cause of the marks in the glazed surface. It has much the appearance of being a mark on the glass on which the enamelled surface is formed. We have seen somewhat similar markings caused by the waxed surface being disturbed, and partially dissolved by the ether in the collodion when coating the plate. The carbon prints are very good indeed in every way.

G. F. L.—The pyroxyline you describe, which gives a thick, glutinous collodion with two grains to the ounce of solvents, is not suitable for photographic purposes. It might answer for surgical purposes, but will not yield satisfactory negatives. It has been made at too low a temperature, or with acids too strong.

R. M. D.—The ferrotype sent has been over-developed. In producing collodion positives it is of great importance not to carry development too far, or all detail becomes buried, and not visible by reflected light. The development must not be carried so far as for negatives. We like a collodion giving a film of good body; we should consider yours too thin. A developer containing twelve grains is strong enough. About one drop of nitric acid is an improvement.

Inquirer (Westbourne Grove).—You will find instructions for printing on silk, &c., in our Year-Book for 1867, on page 92; and in the columns of the News for 1866. Should you not have access to either, we will reprint the instructions.

C. Cox.—It is very probable that your streaks are due to the presence of a floating scum on the surface of your bath. Take a narrow strip of clean blotting-paper, and drag it over the surface of your solution until all trace of floating scum is removed. Bear in mind also that excess of nitric acid will cause fog. When renovating a bath, try it first before adding acid.

W. H. M. (Bristol).—We have sent back your diagram. You will find twelve feet more convenient than sixteen feet. We should also place the ridge out of the centre, and have it a foot higher, and the eave at the glass side a foot lower. This will give more light and a better angle.

J. Maycock.—There is no invariable rule in the matter. We hold it by the lower left-hand corner It is quite possible to produce a transparent image on a wet collodion plate by exposing it for a few seconds under a negative to the flame of an ordinary gas-burner.

Several Correspondents in our next.

The Photographic News, March 22, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Prizes for Photographic Progress, and Captain Paget's Prize in Particular—Haugk's Method of Recovering Gold from Toning Baths—Germany at the International Exhibition of 1878.

Prizes for Photographic Progress, and Captain Paget's Prize in Particular.—Captain Joseph Paget's liberal offer to place the sum of fifty pounds at the disposal of the Photographic Society to be awarded in the shape of a prize for the best dry-plate process will, it is hoped, help towards the attainment of a more perfect method than those at present known to us. The emulsion methods of to-day are, it is true, far from unsatisfactory, and in the hands of many they are worked as—certainly almost as—wet collodion films. At the same time, it must be admitted that there is plenty of room for improvement. In the case of those who prepare their own emulsions, and are conversant with the whims and short-comings—if they may be so called—little, perhaps, can be done; but the great majority of photographers have neither time nor capacity for the proper production of the materials with which they work. What they desire is to have a simple process put in their hands, which they can control and understand thoroughly, like they do the wet process, and which shall be as trustworthy. Now most of us know this is not the case with dry processes. If we go on a journey, whether it is for a day or a month or a year, and we decide upon taking dry plates in lieu of the cumbrous paraphernalia which wet collodion involves, we know very well that we do not enjoy one advantage except at the expense of another. We get rid of a vast amount of impedimenta, but, on the other hand, we risk uncertainty in our results. And the worst of it is that there is little chance of correcting that uncertainty. Double exposures frequently do not avail, and the more care one sometimes takes in manipulation, the more hopeless, apparently, are the results. Of course it is possible to develop dry plates on the spot just as readily as wet ones, but if a dark tent and solutions have to be carried, then most of the advantages of the dry plates fall away. If, then, Captain Paget's generosity in any way helps us to the solution of that important problem, dry plate photography, we shall all of us feel deeply grateful. It is not the first time that a gentleman has come forward to stimulate photographic research in this way. Captain Paget has some very good precedents before him. First and foremost there is that of the late Duc de Luynes, whose prize of 10,000 francs for improvements in photo-mechanical printing will long be remembered. In that case the sum was divided into two portions of 2,000 and 8,000 francs, but the bulk of it—if not the whole—went to the same person, M. Poitevin, who certainly did a vast amount of experimental work in the early stages of collotype and carbon printing, if he was not very successful in the practical application of his own discoveries. Then we have the generous gifts of Mr. Robert Crawshay, of Cyfarthfa Castle, whose munificence approached very nearly that of the Duc de Luynes. Mr. Crawshay's efforts, as our readers know very well, were directed towards the attainment of a broader style of portraiture among photographers, so that they might occupy themselves with something more than small pictures of the carte and cabinet stamp. There cannot be a doubt that Mr. Crawshay's efforts bore good fruit, and, by carrying photographers with him to an extensive size, have led to far more ambitious pictures than we were previously acquainted with. In France and in Belgium we hear, too, of prizes, and in both these cases they were offered for the same object as that now specified by Captain Paget. The French Photographic Society and that of Belgium offered five hundred francs each of them for a more perfect dry process, and the former adjudged the prize to M. Alfred Chardon for his emulsion process, while the latter gave it a month or two ago to M. Leon Warnerke, with whose tissue all our readers are familiar. In the case of the French competition there was, strangely enough, only one candidate who fulfilled all conditions, so that M. Chardon had what is practically known as a walk-over. M. Chardon does not claim to have invented a new process; indeed, it would have been absurd of him to say so, since it is nothing more nor less than the familiar bromide of silver emulsion method which he employs. But few will deny that he has done some good work in carefully considering the details of the process in its various aspects, and in elaborating manipulations whereby a purer and more trustworthy product may be obtained. His method of preparing the bromide emulsion, which has been described in these columns, is certainly a very good one, if it is not the best that can be adopted. M. Warnerke received the Belgium prize, in the shape of a gold medal, for the process, which he has many times referred to in the News. In his case it was necessary to present himself before the Commission at Brussels, and in the presence of its members to prepare the product for which he claimed the medal in question. Chemicals and collodion which were provided by the Commission could only be used, and, in a word, the candidate had to undergo the most searching criticism before the award was made. We trust that the Council of the Photographic Society, who, we are informed, have already appointed some of its members to carry out the wishes of Captain Paget, will act in the same thorough spirit as that which inspired their Belgian brethren, for a prize of fifty pounds, or 1,250 francs, is well worth having. We do not know if it is the intention to confine the competition to Great Britain, but in any case the task of adjudicating the prize will be no easy one, and those to whom the work is entrusted are quite sure to have an arduous as well as thankless duty to perform.

Haugk's Method of Recovering Gold from Toning Baths.—A method of recovering gold from old toning baths is published in the *Chemischen Centralblatt* by Herr Fritz Haugk, with which many of our readers may not be familiar. Herr Haugk transforms his precipitate again into chloride of gold, and is thus enabled to employ it again in photographic printing. He collects together his waste toning baths, and, when a sufficient quantity has been secured to make it worth his while to manipulate, the liquid is filtered into a flask; it is then made alkaline with bicarbonate of soda, and further coloured a deep red with a solution of aniline red. On exposing the liquid to light for six or eight hours, the gold is precipitated in the form of a violet powder. The supernatant liquid is poured off, and when a sufficient quantity of the powder has been collected, it is transformed by chemical means into chloride of gold, ready to be once more used for toning silver prints.

Germany at the International Exhibition of 1878.—The Prince of Wales is throwing himself energetically into the work of the Paris International Exhibition. He has lately spent a week in the French metropolis, personally supervising the fitting up of that portion destined to hold the contributions of Great Britain and her colonies; moreover he is himself a contributor in a large way, and has already despatched several vans loaded with art treasures from Marlborough House to the building on the Trocadero. In fact, the horizon of the exhibition looks far brighter now than on any previous time. An International Exhibition at Paris would never be a failure; still it might be but a *demi-succes* if many of the Great Powers held aloof. The war seems now over for good, the circumstance that Russia has had quite fighting enough, while this country has shown itself amply prepared for struggle, having no doubt some influence in the matter. The Exhibition will therefore get some attention from Eastern Europe, while at the eleventh hour, now that its success is assured, Germany has expressed its willingness to come forward and take a share in the show. All sorts of reasons but the right one, no doubt, are put forward to explain her conduct, but we should not wonder if the Prince of Wales's visit to Berlin last month had something to do with rescinding the decison in high quarters.

The Crown Prince of Prussia, who has more liking for England and the English than most of his countrymen, is said to have been instrumental in bringing about this happy change of things, and causing Germany to be represented as usual in the International Exhibition for 1878.

ON CRYSOIDINE AS AN ADIACTINIC MATERIAL.

BY JOHN SPILLER, F.C.S.

SINCE M. Bardy called attention to the use of crysöidine for making a non-actinic varnish, and for stopping out the chemical rays from the dark-room, the physical properties of this yellow colouring-matter have been examined and reported upon by your Paris Correspondent, M. Ernest Lacan, and again recently by MM. Eder and Von Toth,* who have, upon the whole, passed a very qualified verdict in favour of its employment.

Like these gentlemen, I have also made a trial of this colouring-matter, and compared it in the spectroscope with aurine (coralline), which has for years past received application for the same purposes. The latter seems to me very far superior, not only on optical grounds, from cutting off the upper green rays more effectually, but, being soluble only in alcohol, and not in water, is not so easily washed off by the condensation of moisture upon the window panes, as happens with the more soluble crysöidine, which is, moreover, a deliquescent substance ill fitted for such applications. If paper be saturated with an alcoholic solution of aurine, and dried at the fire, or if collodion, deeply coloured with it, be used as an adiactinic medium, it approaches more nearly to the red glass which MM. Eder and Von Toth found to be so very efficient; besides, we know that crysöidine, when used as a dye, soon fades to a pale brown, and then presents very little obstacle to the passage of the chemical rays. On all accounts, therefore, I hold crysöidine to be decidedly inferior as an adiactinic agent to the more readily procurable aurine cakes, which can be purchased at about one-eighth the price, and will be found quite unalterable on exposure to light.

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PHOTOGRAPHIC PRINTING PROCESSES IN THE SERVICE OF THE PORTUGUESE GOVERNMENT.

BY JOSE JULIO RODRIGUEZ.

1. *The preparation of negatives from linear drawings.*—Here, as everywhere else, the first and most important condition for the successful pursuit of an industry is simplicity.

With all the collodion, silver baths, gold baths, &c., for which we have so many and so various formulæ, there are only a few capable of being used in a great institution, particularly in one where work must be executed within a fixed time and under special rules and circumstances. For the photographic reproduction of a linear drawing which has no half tones the ground of the negative must be perfectly opaque, the lines, on the other hand, quite transparent. Only a few operators are successful in this, though upon the production of a perfect negative of this kind the whole question of photo-lithography and heliography depends.

One method of working is as follows:—Two baths are used for cleaning the glass plates, a solution of caustic soda to clean off the fatty and resinous particles, and a mixture of a weak solution of bichromate of potash and sulphuric acid for removing all other impurities. The plate is next washed and wiped dry with a linen cloth, when it may be placed ready for use. Any remaining traces of impurity can be rubbed off with a little French chalk and spirits of wine.

The collodion is made in quantities of from ten to fifteen litres at a time. When iodized with the cadmium salt it remains good for months, but is only adapted for copying linear drawings which have no half-tones.

The silver bath is weakly acidulated with nitric acid. For large plates troughs of ebonite with covers are used.

After exposure in the camera, as much pyrogallic developer is poured on the plate as will just completely cover it; and it is then placed on a stand, which can be levelled by the help of three screws. After this, another dose of the developer, to which a few drops of four per cent. silver solution has been added, is poured on it, and this is made by a gentle motion to flow backwards and forwards over it, until the negative is everywhere equally intense.

It is then fixed with a saturated solution of soda, again washed very carefully, and a saturated solution of mercuric chloride poured on it and allowed to act till the whole film has become white. After a third washing it is covered with a very weak solution of potassium cyanide, which blackens the film.

If the time of exposure be correctly judged, the result will be most satisfactory; though after the blackening with potassium cyanide, and another washing, it may be still further intensified with pyro. and silver.

The varnish has a particular composition.

Positives for the heliography of copper plates are produced by tannin plates and an acid developer.

Most negatives, either before or after printing with gelatine containing glycerine, are taken off the glass and kept between smooth cardboards.

FORMULA.

Collodion Cotton.

Sulphuric acid, 66°	500 grams
Nitric acid (sp. gr. 1·4)	256 „
Cotton wool (which has been washed in a weak solution of caustic soda and afterwards well dried)	20 „

The temperature of the water bath must be 60° C., and the time of immersion seven minutes.

Collodion for linear drawings.

Alcohol (40° Cartier)	500 c. c.
Ether 65	500 „
Collodion cotton	11 grams
Cadmium iodide	6 „
Ammonium iodide	5 „
Ammonium bromide	2 „

Developer.

A.—Distilled water	1 litre
Glacial acetic acid	20 grams
B.—Pyrogallic acid	100 „
Alcohol 98°	1 litre

Mix 1 litre of A with 50 c. c. of B.

Fixer.—Saturated solution of fixing soda with a few drops of ammonia. This must be prepared some days before using.

Varnish (buy hard and capable of withstanding heat).

Alcohol 95°	4 litres
Orange shellac	360 grams
Oil of lavender	100 „
Turpentine	80 „

To be laid on warm.

Varnish (for alcoholic collodion which has been prepared with soluble cotton).

Alcohol 95°	6 litres
Gum elemi	80 grams
Benzoin	240 „
Orange shellac	240 „
White shellac	120 „
Turpentine	160 „

2. *Artificial Negatives for Photo-lithography and Heliography.*—On a well-cleaned glass plate is spread a layer of the following mixture:—

Gelatine	8 to 10 grams
Water	100 „

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* See PHOTOGRAPHIC NEWS, March 1st, page 105.

Carbonate of lead as much as will make the mixture to a paste.

The lead salt must be ground quite fine, and be perfectly free from grit. Rub the mixture for some minutes on a colour-stone, and apply it to the glass plate with a brush; it must be equally distributed, that no transparent places may be seen. Allow the layer to dry in the open air, or at a gentle heat. Now lay the plate on black paper, and with a needle scratch in the drawing, which must first have been transferred to the layer of tracing paper. Retouching is done with a brush and white colour. After brushing off the dust raised by the needle, immerse the plate in hydrosulphuric acid, when the white will be turned to a dark yellow. Then let it dry at a gentle heat, and varnish with negative varnish.

The negative is reversed, as it must be in a direct process of typography for photo-engraving. By printing over each other different negatives, produced either by hand or machine, we can obtain combinations very difficult of imitation; the process recommends itself, therefore, for printing bank notes and other papers where forgery may be apprehended.

(To be continued.)

ON THE ELIMINATION OF THE CAUSES OF FOG FROM EMULSIONS.

BY CAPTAIN ABNEY, R.E., F.R.S.*

IN papers that have been read before the Photographic Society, it has been shown by what means fog on plates can be removed; but they were not, perhaps, sufficiently explicit on the removal of the cause of fog from the emulsions themselves. It is therefore proposed to treat of this question. In an emulsion, whether washed or unwashed, the chief basis of sensitiveness is bromide of silver, and if this can be obtained in a pure state, experiment has shown that there is no inclination to fog. In preparing bromide emulsion, however, we have causes at work which prevent the formation of the pure bromide, unless one of two conditions are fulfilled—either (first) there must be an excess of soluble haloid, or (second) something must be added in the shape of acid to the mixture if silver nitrate is to be in excess.

It must be premised, however, that anything that will act as a nucleus on which the metallic silver, produced during the action of development, can deposit, will cause fog. This quantity may be very minute, as can readily be understood when the small quantity of the haloid salt reduced to the sub-haloid state by the impact of light during a short exposure, is considered. Let any one who doubts the fact try adding a small quantity of silver oxide to a neutral emulsion which is working brightly, and note the result in developing a plate prepared with it.

We will treat of the first case; and the reason of this method giving freedom from fog is very simply explained. In the soluble bromides—and, it may be, sometimes in the silver nitrate—we *always* have impurities, no matter how carefully the preparations may have been made, and even if they have been originally what they profess to be, yet afterwards, by contact with the air, they become contaminated. The impurities may be, and often are, so small that they cannot be traced by ordinary chemical means; but light is able to detect them for us. In some recent experiments we have carried out we have found that silver bromide is formed before any other silver compound except the iodide, when the sensitive salt is formed from haloid salts, and not the halogens themselves. Thus, if potassium bromide be contaminated with potash (as is sometimes the case in appreciable quantities), and if silver nitrate be added, we shall have both silver bromide and silver oxide formed, if an excess of silver nitrate be added; but if there be a defect of this salt there will not be a trace of silver oxide, but only silver bromide. Again, if we take bromide of copper, which is usually contaminated with the sub-bromide, it will be found that the bromide is all utilized before the sub-bromide is attacked at all; and if, in addition to the bromide, we have a metallic chloride present which may be contaminated with subchloride, the order in which they will combine with the silver nitrate is:—Bromide, chloride, sub-bromide, sub-chloride. Thus, if there be only sufficient silver nitrate added to an emulsion to combine with the two first on the list, the other two will be left in the emulsion as harmless compounds. The *rationale* of the elimination of fog from the furnished emulsion in which there is *at first* an excess of silver nitrate is thus demonstrated. Supposing we have an emulsion which contains bromide, sub-bromide (which can exist as shown in a paper "On intensifying negatives with copper bromide"), and oxide of copper, and also a slight excess of silver nitrate. The addition of certain metallic chlorides or of hydrochloric acid will at once convert the sub-bromide and oxide into the chloride of silver, leaving harmless compounds behind. The metallic chlorides which are of use are those which readily part with chlorine, and which, therefore, preferable form more than one chloride, such as copper, cobalt, gold, platinum, &c. When other chlorides, such as of the alkalies, are employed, the needful substitution may not take place, because the affinity of the alkali for the chlorine is greater than for the sub-bromide; and therefore the elimination of the sub-bromide is not effected. Thus, supposing all the silver nitrate in original excess is converted into silver chloride, we have the silver sub-bromide to get rid of. Thus, supposing we are using sodium chloride as a corrective, then we should have—

$$Ag_2\,Br + NaCl,$$

which can form no new compound, since an atom of metallic silver or sodium cannot be left in a free state; but if we use—say cobalt chloride, we have—

$$Ag_2\,Br + CoCl_2, \text{ which can form —}$$
$$Ag\,Br + AgCl + CoCl.$$

The CoCl, or sub-chloride of cobalt, is harmless, and can be washed out of the film.

It will, therefore, be seen how it is that an excess of haloid salt gives freedom from fog.

Secondly. If an excess of silver nitrate be used, it is evident that something else besides a mere chloride will be required, since the sub-salts and oxides may be formed. This we find in the employment of an acid, or halogen itself, or both together, added to the collodion, and to be most rapidly effective. This should be added to the soluble salts before the silver nitrate is added.

Suppose nitric acid alone be employed, then any oxide or carbonate will immediately be attacked, as also any of the sub-bromides—such as of copper. Again, if aqua regia be employed, we know that chlorine is evolved in an extremely nascent state, and that this would attack either oxide or sub-bromide, fully saturating the unsatisfied atom in the latter. If, now, silver nitrate be added, silver bromide and chloride would result with some compounds (perhaps such as the chlorate), which would be as inert as the silver nitrate itself.

If a halogen be employed without any acid, the same result would occur. Thus, suppose we had as impurities an oxide and a sub-bromide, and that we added a solution of bromine to it, we should get the oxide changed to a bromide and bromate (the latter salt of which is experimentally proved to be inert), and sub-bromide changed to a bromide.

If the halogen be added last, when there is an excess of silver, it is probable that until all the latter is converted it will exert no action; but if an acid, such as nitric acid, be added, it will exert its proper influence, though slowly; for it will convert any oxide or compounds of the oxide into nitrate, and from the silver sub-bromide dissolve away the loose atom of silver, converting the sub-bromide into bromide and nitrate. Thus :—

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* *Photographic Journal.*

$$4Ag_2Br + 6HNO_3 = 4AgBr + 4AgNO_3 + N_2O_3 + 3HO.$$

After an emulsion has been washed, naturally any one of these agents will remove the fog ; but they must be added cautiously, otherwise insensitiveness must result.

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ON THE FADING OF CARBON PRINTS, AND THE SUPPRESSION OF BICHROMATES IN CARBON PRINTING.

BY DR. D. VAN MONCKHOVEN.*

Many photographers have already noticed the alteration which takes place when carbon prints have been exposed for a few weeks to the influence of the solar rays. These prints lose their beautiful colour, and become yellowish or of a dingy green. This fact has been attributed by everybody to the employment of fugitive or unstable colouring matter—such as cochineal, for instance—in the manufacture of carbon tissue. But, as will be shown by this memoir, there is another cause in addition to the preceding.

It is generally admitted that light, in acting upon bichromate of potash in combination with organic matter—such as gelatine—reduces this salt to the state of sesqui-oxide of chromium, which locally renders the organic matter insoluble. Warm water will wash away that which remains unaltered. I should not be inclined to argue against this *theory*, if it were not that the *facts* are so contrary, as the following experiments will prove :—A sheet of paper is immersed in bichromate of potash and dried. It is then exposed for an hour to daylight ; next washed for an entire hour in boiling water, to be afterwards immersed in an alum solution for several hours ; afterwards washed in cold water, and finally hung up to dry.

According to the before-mentioned theory, this paper should contain nothing more than a salt of sesqui-oxide of chromium, absolutely unalterable by the action of light. But this paper is *yellow*, whire the salts of sesqui-oxide of chrome are *green*. But, moreover, if this paper be exposed to light, a part being covered by a mask of black paper, it undergoes an alteration in the course of a few weeks, and a sharp distinct impression of the mask is brought to view. Now, where the light has acted, the paper is *green*, like the salts of sesqui-oxide of chromium.

This experiment, and many others which we have made in this direction, prove, to our thinking, that neither hot water nor alum *fix* carbon prints. It is true the excess of bichromate is removed by these means ; but the chromic salt which has rendered the gelatine insoluble not only *remains*, but this salt itself *undergoes a change by exposure to daylight*. And while thus deoxidising, it accelerates the action of light upon the organic colours which constitute the image, and so these colours fade much more rapidly than they would otherwise.

Naturally I have endeavoured to find a fixing agent, and have succeeded. Thus in the case of the paper immersed in bichromate, exposed to light, and washed in boiling water, if instead of alum it is immersed in *bisulphite of soda*, it will, when dry, be absolutely unalterable by any subsequent exposure to light. Knowing these facts, and with the object of rendering carbon prints unalterable, I have directed my attention to the mineral and organic colouring matters which are reputed to be unfading—such as indigo, madder, the oxides of iron, &c.

Indigo (purified by a preliminary dissolution in fuming sulphuric acid, &c.) is a blue colour reputed permanent, and useful for the manufacture of tissue of a purple tone. Experiment, however, has proved to me that in carbon tissue it changes its colour by the influence of light. It will, therefore, be best to abandon the purple tone, for, with the exception of indigo, there does not exist any solid or permanent blue colour. And now as to madder. It is known that the roots of madder, boiled in an alkaline solution, give up their colouring principle, and that alum added to the above alkaline solution precipitates the colouring matter, forming an aluminate. This product is known as *madder lake*.

Mr. J. W. Swan, in a private letter dated 1875, called my attention to purpurine—a substance which I studied at this period, as well as alizarine. These two products constitute the colouring principle of madder. Here is the method which I have made use of, and which gives a very good lake :—60 grammes of alizarine are dissolved in 3 litres of boiling water, to which has been added 180 cubic centimetres of ammonia, of a density of 0·910. The whole is then well shaken and filtered boiling. Another boiling solution, consisting of 300 grams of alum, dissolved in 7 litres of ordinary water, is then poured into it at one dash—without stopping. The mixture is left for twenty-four hours to settle, and then filtered. The filtered liquid ought to be colourless, and not rendered turbid by the addition of a weak solution of carbonate of soda, which would denote an excess of alum. The precipitate is pressed, mixed intimately with glycerine, and ground up.

If this method be exactly followed, the aluminate of alizarine thus prepared will not stain single transfer paper, because it no longer contains alizarine, and will not render the film of gelatine subsequently insoluble, because it does not contain an excess of alum. I place, however, at the disposal of the Society the alizarine employed, and the lake madder prepared according to this method. This lake madder has been for some years commercially obtainable.

Instead of ordinary alum, use can also be made of *iron alum*, or of a salt of peroxide of iron. The precipitate obtained would appear, on a cursory glance, to be black ; but it is of a very beautiful red—provided an excess of iron has not been employed. I have employed this lake for certain colours for a considerable time past. The lakes of madder, or compounds of alizarine, have the reputation of not fading under the influence of light, because in dyeing and painting they have been used for many years. However, these colours employed in carbon tissue *are* alterable by light, and it suffices to expose a print to the sun under a band of black paper during ten days or a fortnight to discern very plainly the part which has been protected by the mask.

And now I place in the hands of the members present the proofs of what I have stated, and every one will be able to make a similar trial. Pictures exposed in October last are to-day completely changed in colour, having become yellow like the old silver prints. (This can be seen better in daylight than in the evening.)

That which speciallv proves that the action of the light is aided by the chromic salt is, that if the colour be spread by itself upon paper, it resists infinitely better, although if laid on thinly, it does alter. When we say that indigo and madder do not fade under the influence of light, it is true only in wool, silk, and cotton fabrics, which are stained through a considerable thickness of material ; but it is not true when the same colours are spread out in thin films precisely as we find them made use of in carbon tissue or carbon prints.

And now let us proceed to the consideration of the metallic oxides. Students of mineralogy are well aware that among the oxides of iron are some of a superb and varied red. But painters know also that these oxides, ground up with oil or water, give dull and muddy tones. Now, for photography, it is necessary that tne colours used shall be *transparent*, because it is the various thicknesses of the coloured film which form the half-tones.

A chance experiment led me to the discovery that if the oxides of iron lack transparency, it is due solely to a physical cause—namely, that they are too hard to be reduced mechanically to their finest state of division. As a proof, if strong solutions of perchloride of iron and of soda, *thick-*

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* Read before the Photographic Society of Great Britain.

ened by sugar, are mixed, peroxide of iron will be formed in a spongy and finely-divided state. Dry one-half of the product. It gives, after grinding up with the gelatine, an opaque film upon glass. Now let us make use of the other half gathered moist, upon a filter, mixed with glycerine and gelatine, and we shall obtain a transparent film upon glass, because the colouring matter is actually dissolved.

By varying the temperature pressure, and other purely physical conditions, we can obtain from oxides of iron and of certain other metals, red or brown colours very beautiful to the eye, and absolutely and infallibly unalterable by exposure to light.

These, then, are the colours which I now use, which I shall continue to use henceforth, and the adoption of which I recommend strongly to all manufacturers of carbon tissue. I could easily have taken out a patent for these colours, but it is my opinion that patents are the best contrived means for retarding the general adoption of the carbon process.

I possess prints (and I shall be happy to place them at the disposal of any persons who may ask me for them, in order that my statements may be verified) which have been exposed to the sun for about eight months, and which have undergone no change whatever. No organic matter—cochineal, madder, or indigo—could withstand a similar trial.

In conclusion, I shall lay before you the experiments I have made with a view to do away with the use of bichromate of potash in the carbon process. A piece of ordinary carbon tissue is immersed in an aqueous solution (20 per cent.) of citrate of iron and ammonia, dried (in the dark), exposed behind a negative, wetted and transferred to glass—the usual operations. On developing with warm water— *no trace of an image is visible!* But if, after exposure to light, the carbon tissue, instead of being wetted in ordinary water, is put into a solution of bichromate of potash, and be then immediately transferred to glass and developed with warm water, the action of the light upon the iron salt is transmitted to the bichromate of potash, and a picture appears. Instead of wetting the print in bichromate of potash before transfer, use may be made of bichloride of mercury and some other substances which I shall point out on a future occasion. If tannin be employed, the action of light is reversed, and a negative is obtained.

Instead of the ferric salts, I can also make use (with some modifications) of the stannic and other metallic salts, the bases of which have several degrees of oxidation; but the detail of these experiments would occupy too much time. Let it suffice to say that the greatest difficulty I have had to conquer has been the preservation of the half-tones.

I shall continue to prosecute my researches in this direction, and I hope soon to be able to submit to the notice of the Society a new carbon process, wherein the bichromate will be suppressed, and double transfer for the *redressement* of the pictures rendered unnecessary.

In bringing these facts before the public, my great object has been to cause others to make still further researches, and I shall be most happy if they lead to practical results—whether myself or others find them out.

Dr. Monckhoven sends us the following observations on our last week's leader:—

"I never affirmed that all the actual carbon prints *must* fade—that is to say, *disappear*—as silver prints. I have had in my possession carbon prints since 1864, and they are in a very good state. What I affirm is, that those prints made with large quantities of cochineal, or madder lake, those called rich brown or rich purple, will undergo a change of tone when long exposed to light; the first become yellow, the second greenish black. *But they will not disappear*, because the black pigment will remain.

"As regards the theory of the formation of the image, I am also of opinion that, in the action of light on chromated gelatine, the result is a chromate of sesqui-oxide of chrome. But you affirm that *water destroys that salt*, so that finally a sesqui-oxide of chrome remains. Allow me to ask you what experiments have you made that water destroys the chromates of chrome (there are are several kinds of that salt)? That is the truth for one of them, when prepared in a test tube and washed *a very long time—for days!* But when that salt is mixed with gelatine, as it is in carbon printing, water can with difficulty penetrate through and through the thickness to remove that salt, which so remains in greater part.

"Make the following experiment;—Cover a sheet of paper with bichromate gelatine to which sulphate of baryta is added. Allow to dry, expose to light, transfer on glass, develop with mixed warm water, place in alum, wash well *several hours*, and allow to dry. We have now a white image. Is that image white? No; it is yellow. Let us expose it to light, under a black mask, and, after *one month* the trace of the mask is marked by light. The same occurs on a single sheet of paper covered with gelatine, or even a single sheet of paper immersed in bichromate, exposed to light, &c. After washing, the paper is yellow, and can receive a further impression of the light.

"Now, careful investigation by chemical analysis proves that the salt of chrome, which forms that yellow image, is not sesqui-oxide of chrome. It must be one of the numerous chromates of chromic-oxide, but what, I hope to tell you in my next letter. Now, how astonishing, if a chromate remain in the carbon image, that the madder or other organic colour which constitutes partly that image, is attacked by light far more rapidly than if that chromate were removed. Every chemist knows what powerful oxidizing agents are the chromates under the influence of light.

"Now, what I ask is this:—Mix with the alum bath a quantity of bisulphite of soda (SO^2)—that is a very cheap salt. If the yellow carbon print (with white pigment, as remarked above) is immersed for a short time in that bath, the sulphurous acid reduces immediately the chromate (of every kind) to sesqui-oxide of chrome, and then the image no more receives any further action of light. If you place a solution of bichromate of potash in an excess of solution of bisulphite (SO^2) of soda immediately, the liquid becomes *green*, and chemical reactions indicate the salt of sesqui-oxide of chrome.

"Before contesting these facts, and making theories or hypotheses, would it not be better to repeat such simple experiments as those I indicate, and would it not be more logical?—I am, dear sir, yours faithfully,

"Dr. D. V. Monckhoven."

[We shall have to refer to the subject again shortly, and shall have some observations to make on Dr. Van Monckhoven's remarks.—Ed.]

American Carbon Association.—At a meeting of carbon workers held in New York, Dec. 20th, during the exhibition of permanent photographs, an association was formed having for its object the mutual benefit and improvement of the licensees under the Lambert patents. Temporary officers were unanimously chosen, as follows:—C. Gentile, president, New York; T. C. Roche, treasurer, New York; W. A. Cooper, cor. sec., St. Thomas, Ont.; J. Loeffler, local, New York. To make the Association thoroughly efficient, and to more successfully accomplish the end in view, each of the United States and provinces in Canada is represented. A great deal of good feeling and enthusiasm prevailed amongst the members at this the first meeting of the Association, the necessity of which American carbon workers have greatly felt. This was enhanced by the success of the exhibition just closed, the second gotten up and carried so successfully through by Mr. Lambert; and if the same improvement is displayed during the coming year that has characterized the one now closing, the next meeting will exceed the most sanguine expectations of the members. It was agreed that *Anthony's Bulletin* and the *St. Louis P. P.* be recognized as the official organs of the Association.—*Anthonys Photographic Bulletin.*

The Photographic News.

Vol. XXII. No. 1020 - MARCH 22., 1878.

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THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

Our last issue contained a copy of a circular just issued by the Photographic Society, briefly setting forth the history, aims, and achievements of the Society, and its claims to support from photographers Remembering at the outset that neither the Society nor those who spend time, thought, and effort in its management, have anything to gain by the support and adhesion of photographers generally, it might seem strange that any special effort or appeal should be made in order to increase the number of members and extend the operations of the Society. There is, however, fortunately for the progress of the world and the welfare of society, an element of zeal in individuals and of *esprit de corps* in bodies, which induces energetic effort to promote a good cause, quite apart from any consideration of personal interests. And the members of the Photographic Society, feeling the advantages of the communion with such a society affords, and being conscious that increased numbers mean extended power for usefulness, are naturally anxious to see the Society enlarge its boundaries.

Unfortunately, at the present time the Society is in a diminished condition, and needs a considerable accession of members to give it any chance of activity and usefulness. The total number of members at the present time does not exceed 263, and of these 52 are honorary members, or foreign members, or have compounded, and pay no income to the Society, so that the total income of the Society is a guinea a year each from 211 members, with the exception of a few entrance fees each year from new members. So far as we can glean from the accounts, the ordinary expenses of the Society are in excess of the income, a state of things which cannot long continue without catastrophe of some kind. A large accession of new members, bringing increased funds to the Society, is necessary, and we hope such an accession will be obtained. A correspondent, whose letter appears on another page, enquires why the Society does not extend its scope of usefulness, and make some effort in securing the education of photographers in their art; or, failing this, why it does not, at any rate, establish a system of examination of candidates, and granting certificates of efficiency. At present, a very simple answer is ready. The Society cannot, with its present limited means, undertake any new duty. We must confess that the array of actual advantages enumerated in the Society's circular is less extended and attractive than we should like to see, and scarcely worthy of a national society. If it were possible, we should like to see the Society's diploma a highly valued certificate of competency, and we should be glad to see lectures or classes established for tuition in the branches of science and of art especially pertaining to photography. The technical examinations to be undertaken at the Society of Arts, with award of prizes voted by the Photographic Society, constitute, we think, a step in the right direction; but we must confess that we should have been better pleased if such a scheme of examination could have been undertaken by the Photographic Society. Such a step would have secured its prestige and extended its influence. We are anxious to see the Society successful, and should regard its further decline as a grave misfortune to the art. The cost of membership is not large, and we would heartily commend membership to all our readers. Those not entirely satisfied with its present action would, as members, have influence in modifying its operations, and giving it new impetus to extended usefulness.

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PRIZE FOR A DRY PROCESS.

It is a satisfactory evidence that the spirit of finality is not universally prevalent amongst photographers when a gentleman comes forward and offers a prize of fifty pounds sterling for a successful dry process which shall meet certain very reasonable requirements. Mr. Joseph Paget, whose name is not unfamiliar to our readers, writes to the Council of the Photographic Society as follows:—

Stuffynwood, Mansfield, Notts, March 7, 1878.

Dear Sir,—In practising photography as an amateur, both by the wet and by some of the dry-plate processes, I have found that the latter have, to a certain extent, the advantage in point of convenience; but only to a very limited extent, because I think that a really good dry-plate process has not yet been invented.

By a good dry plate I mean one which, giving as good a finished negative as can be obtained from a wet plate, will also keep indefinitely before exposure, and which, if developed three or four months after exposure, will give as good a negative as if it had been developed on the day of exposure. This quality of keeping after exposure is of the first importance to an amateur, and appears to me to have been too much lost sight of by those persons who have turned their attention to the improvement of dry plates.

It has occurred to me that the offer by of me a prize of £50 for the best dry-plate process, to be afterwards published to the photographic world, might be an incentive to an improvement in this direction; and I know of no persons so competent to carry out the scheme as the Council of the Photographic Society of Great Britain, if they will kindly consent to take the trouble of so doing.

I have already conversed on the subject with my brother-in-law, Captain Abney, and he fully understands my wishes, so that I need not trouble you further at present. If the Council will entertain the question, I shall be pleased to receive suggestions for any alterations in the scheme which they may think advisable. —I remain, dear sir, faithfully yours, Joseph Paget.

It will be seen that Mr. Paget lays down no unreasonable conditions as to rapidity. His primary aim is keeping qualities after, as well as before, exposure. It will readily be admitted by most dry-plate workers that here is generally the point of shortcoming. Unless a plate be developed within a few days, or weeks at most, of its exposure, the image gradually deteriorates and disappears. Collodio-albumen plates, with a final wash of gallic acid, have been supposed to possess immunity from that failing, but Mr. Paget has not, we apprehend, found them satisfactory. The idea of such a prize is not a new one to Mr. Paget. We remember, in a conversation with him nearly three years ago, he asked our opinion of the desirability of such a step. The response of the Council of the Society has been the appointment of a committee to consult with Mr. Paget, draw out conditions of competition, and make preliminary arrangements, all of which will be duly announced, after which we hope to see an active competition, issuing in the publication of a successful process.

A question arises in relation to the effect of prizes of this kind. The offer presupposes that an amount of ingenuity, experience, and skill, sufficient to produce a successful process, at present lies *perdu* for lack of an incentive to develop it, or bring it into a focus. Is this really the case? Or, if the *feu sacre* of invention exist, will it not blaze out without the stimuli of prizes? We cannot say. Nor does the history of prizes of this kind furnish much information. The last prize offered for a dry process was in France, and issued, not in the discovery of a new one, but in the production of an excellent method, compiled from methods published in this country, but compiled with such intelligence, skill, and experience as to produce an excellent process. It is probable that the process meeting the conditions of Mr. Paget's competition will be a compilation—that is, a combination and modification of known methods. On the other hand, it is true that the Duc de Luynes' offer of the prize for a permanent printing process brought many competitors, but no successes; and the practical carbon process discovered by Mr. Swan was the result of the inherent stimulus of an inventive mind, and not of the offer of a prize. But even here it is probable that the munificent offer of the Duc de Luynes may have had its influence. It kept the idea of permanent printing before photographers, it brought many ingenious workers into the field, whose methods were published, and it is at least probable that these influences had their operation in the mind of the final successful inventor.

It has been suggested that the formation of a committee to examine and report upon all known processes is a more efficient method of getting at success than the offer of a prize for a new one. Such committees undoubtedly should be valuable, but, in the experience of the Photographic Society, they have not been attended with signal success. The printing committee, inaugurated under the auspices of royalty, threw some light on the causes of fading, but did not do much to secure permanency. The collodion committee was an ignominious and costly failure.

We hope the issue of the competition shortly to be initiated will be worthy of the generosity and public spirit of the liberal gentleman who offers the prize, and creditable and satisfactory to the Photographic Society entrusted with the arrangements. We hope shortly to be able to publish the conditions of competition.

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Critical Notices.

A TREATISE ON PHOTOGRAPHY. By W. de Wiveleslie Abney, F.R.S. (London: Longman, Green, and Co.)

The volume before us is one of a series of Text-Books of Science issued by Messrs. Longman and Co. Whilst it is sufficiently practical to constitute an instruction book, it deals rather with the theoretical or scientific aspects of the subject, and enters into the principles upon which the various processes in photography are based. Such a work was much needed, as the mass of photographers, in many cases even the skilful workers, are but imperfectly acquainted with the principles upon which their art is based, this part of the subject having been neglected in most text-books, to give place to essentially practical questions. Captain Abney has included, however, clear descriptions of all the processes in general use in photography, including a capital chapter on pictorial composition. The work is, indeed, as intended by the author, essentially supplementary to his "Instruction in Photography," as it is also to all elementary works of this kind. Such a work must inevitably find its way into the library of every intelligent photographer, to mention its existence being sufficient without offering it the recommendation it so justly deserves. We ought to add that it is copiously and admirably illustrated.

DESIGN AND WORK. A Home and Shop Companion Volume III. (London: G. Purkess, 286, Strand.)

This is a twelvemonth's numbers, forming a handsome volume, of a very useful weekly journal, devoted chiefly to scientific and art industries. It is full of information useful to all readers, and especially to the ingenious and experimental student. We commend it to our readers.

A HISTORY AND HANDBOOK OF PHOTOGRAPHY, Translated from the French of Gustav Tissandier, Edited by G. J. Thompson, F.R.G.S. Second and Revised Edition. (London: Sampson Low, Marston, Searle, and Rivington.)

We spoke in very high terms of the first edition of this work, and we are glad to welcome a second and still more complete edition. A chapter is added on the pioneers of photography in England, a branch of the history of the art which was not, perhaps naturally enough, very extensively dealt with by the French author. One of the most interesting features of this edition is a chapter by the late Mr. H. Fox Talbot, giving details of his early experiments in the course of his photographic discoveries, and also of his subsequent experiments in photographic engraving, together with examples of the results obtained in that direction. The illustrations are throughout a most valuable feature of the work, examples of almost every method of photographic printing, or, rather, we should have said, photo-mechanical printing, being given. Solar printing by any method is not illustrated, the collodio-chloride process of Mr. Wharton Simpson being not even mentioned. An exceedingly perfect Woodburytype portrait of Mr. F. Leighton appears as frontispiece. The book is throughout one of the most interesting and best illustrated works which have appeared in connection with photography.

THE TELEPHONE, AND HOW TO MAKE IT. By Prof. A. E. Dalbear. (London: Sampson Low and Co.)

The author of this interesting little volume is one of the claimants for the origination of the speaking telephone, and is, at least, well qualified to describe how it is made, which, so far as we can judge, he does in clear and explicit terms.

PRACTICAL PORTRAIT PHOTOGRAPHY. By William Heighway. Second Edition. (London: Piper and Carter.)

This is a second edition of Mr. Heighway's admirable manual of portrait photography, which has been called for very soon after the issue of the first, and has afforded opportunity for remodelling and improvement. It is the only manual, so far as we remember, devoted solely to photography as it concerns the portraitist, and is written with much intelligence, conveying the results of much experience and culture in a popular and pleasant manner. Mr. Heighway's writings are so well known and appreciated, that we scarcely need recommend his work to our readers.

MEN OF MARK. Second Series. (London: Sampson Low, Marston, Searle, and Rivington.)

Of the numerous attempts to form galleries of contemporary portraits by the aid of photography, we know of none which can compare in completeness and excellence with "Men of Mark." The size is well chosen, the negatives by Messrs. Lock and Whitfield are generally of high merit, and the printing by the Woodbury process is perfect, in some cases apparently surpassing silver printing. The biographies are brief, terse, and comprehensive, and the work is everyway quite satisfactory.

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FRENCH CORRESPONDENCE.

Photography at the Paris International Exhibition—New Photographic Society.

All our Parisian photographers are just now in a state of intense anxiety to know what resolution the directors of the forthcoming Exhibition will come to on the subject of the reproduction of the works of art and industry which will be shown there. The importance of the works of this kind, which will be ordered on their own account by all classes of exhibitors, and the success with which the public is sure to reward the publication of views of the interior of the building on the Champ de Mars, are quite sufficient to explain this anxiety. Those photographers who will have such an excellent opportunity of pursuing their art to advantage naturally await the decision of the executive on this point with solicitude. In such an emergency the *Chambre Syndicale de la Photographie* naturally could not remain inactive; it has just taken steps to obtain from M. Krantz, the General Commissioner, some assurance calculated to set at rest the general anxiety.

The answer returned to the delegates of the *Chambre Syndicale*, at their first interview with the Commissioner, was precise on one point only; contrary to the plan adopted at the International Exhibition of 1857, where the concession of photography was granted to one firm only, who had to pay heavily for the privilege of being alone permitted to take photographs within the precincts of the Exhibition, there will be on this occasion no monopoly allowed. But, supposing that a monopoly be excluded, will perfect liberty be accorded? Will every photographer be permitted to practise his art at his own pleasure in the galleries and courts? No doubt such an arrangement would have its advantages, but it would be attended with insuperable difficulties. The most rigid regulations and the most watchful supervision would not be effectual in reducing to order such a confusion of persons, of works, and of interests. Liberal as such a measure would be in theory, it seems to us that in practice it would be unworkable; and its least defect is that it would be detrimental to all, but really profitable to none.

Supposing that this democratic idea be carried out, the question arises, Will a free admission be limited to the chief of the firm, or will it be refused to assistants who leave the employment of the houses in whose studios they have hitherto been engaged, and set up for the occasion on their own account? Then, again, will foreigners who are employed by their own countrymen to photograph the objects they exhibit have the same privileges as their Parisian colleagues? A number of similar questions present themselves when the subject is fully considered.

In the course of the discussion which took place at the meeting of the *Chambre Syndicale* on Tuesday last, one of the members expressed an opinion that, giving the most liberal character to the system to be adopted, only photographers who are also exhibitors should be permitted to take views in the interior of the Exhibition buildings. By this means the number of those on whom the privilege is conferred must necessarily be limited, and that in a manner which would have no signs of partiality, and give no cause of complaint to those who are excluded. The idea seems to be a good one, because, if there be any advantage to be derived from the privilege, it is but just that those who promote the Exhibition, and contribute to its success, should receive the benefit.

I have expatiated at some length on this topic, because, as I have stated above, it is just now one of primary importance with Parisian photographers. It is, moreover, of great interest to the whole body of photographic artists, because the decision which we are now expecting may form a precedent for future international exhibitions, whether in France or abroad.

I have lately received—as I suppose my English colleagues have also received—the first number of a new publication bearing the title: *Revue photographique; journal officiel de la Societe francais des Archives photographiques, historiques. et monumentales.* This recently established society—its inception dates only from last year—seems to be, thanks to the energy of its founders, on the high road to success. Its object is to promote the reproduction by photography of all our monuments, places, antiquities, inscriptions, and manuscripts which have an historical interest; it will also encourage photography as an aid to geological, geographical, and astronomical science. In fact, the aim of its founders is to further the application of photography to scientific objects, rather than to describe photographic processes. The Society asks all photographers individually not only to contribute to its collections proofs of the kind above indicated, but also to forward negatives of certain fixed sizes; from these the Society will then have prints taken by some process with fatty ink, and they will then be published for the benefit of artists and scientific men. This appeal has been well responded to, so that the *Societe des Archives historiques* already has numerous documents in its possession.

Last year, when the scientific congress held its meeting at Havre, where the Society has a branch, an exhibition of photographs of this kind was opened, and met with great success. So great was its success that at the close of the exhibition the Society was able to distribute a number of prizes which much older and better known societies might have envied. For this purpose the Minister of Public Instruction, the Prefect of the Seine, and the Municipal Corporation of Havre had presented to this Society many works of art to serve as the higher prizes; gilt, silver, and bronze medals contributed by other societies and by private individuals increased the number of the awards.

Now the *Societe des Archives historiques et photographiques* proclaims once more its existence by the publication of a monthly journal, which will cause it to develop its growth, and to aid in the extension of its useful labours. From these photography cannot fail to extract both honour and profit, for the art itself is their chief element.

Ernest Lacan.

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STEREOSCOPIC TRANSPARENCY PRINTING.

Mr. Breese's Method.—No. I.

BY JOHN HARMER.

Those who are acquainted with the best of Mr. Breese's stereographs will probably expect to read something novel in an account of his process, and will, doubtless, be surprised when they find that the formulæ he employed, and by which he produced so great a variety of effects, were very common, having been repeatedly published a few years ago. To many photographers the subject I am about to treat of will, to a certain extent, be a new theme; so, perhaps, it will be as well to begin at the beginning, then, if there be a fault, it will be rather that of saying too much than too little. I propose to deal first with the formulæ, apparatus, and accessories, and to follow them with some remarks on manipulation, which I shall endeavour to make clear by describing various kinds of effects, and how obtained.

The first thing requiring consideration is the *glass*. This should be of the French kind, which is nearly colourless and very thin; it can be procured, both plain and ground, through Messrs. Marion and Co., or a commission agent in France. Great care must be taken to store it in a dry room, or something like a decomposition takes place, which so softens the surface as to make the glass utterly unfit for the purpose. It is best cleaned with a mixture of carefully prepared tripoli or rouge in spirits of wine, followed by the application, with a tuft of cotton, of a little old collodion to which a small quantity of water has been added, the final polish to the surfaae being given by the removal of this with an old silk handkerchief. Substratums must not be resorted to, as the operations and result are too delicate for anything of the kind to be successful.

The *collodion* most suitable for general use is a ripe sample of simple iodized, such as used to be supplied by the first-class makers for the old-fashioned pyrogallic development, that made by Mr. Thomas being especially good. For special classes of work, one or two other kinds are necessary, but more about those when I come to the circumstances requiring their use.

The preparation of the *nitrate bath* is as follows:—Dissolve three ounces of pure triple crystallized nitrate of silver in twelve ounces of distilled water, iodize this by the addition of two and a-half grains of iodide of potassium previously dissolved in a dram of water. After a thorough shaking, pour the strong solution into the remaining twenty-four and a-half ounces of water necessary to reduce it to the strength of thirty-five grains per ounce, filter twice or thrice through same filter paper, test for free nitric acid, which, if present, carefully neutralize with oxide of silver; filter again, and acidify with from eight to ten minims of glacial acetic acid; this latter should be of the utmost purity, otherwise it will prove a source of much trouble. When great richness of tone is desired, the formation of acetate of silver in the bath by the addition of two or three grains of acetate of soda will be found to contribute towards its production. A caution respecting the use of this bath, especially with the last modification, is necessary to those photographers whose experience has been wholly confined to the use of nitric acid for acidifying. It is exceedingly sensitive to dust and dirt; many kinds of spots, streaks, and comets make their appearance that one does not see when using the hardier bath commonly in use at the present time. Care in preparation and cleanliness in manipulation will, however, be amply repaid by the absence of these defects, and the delicate beauty of the results in other respects.

The *developer* for all purposes of printing is composed of—

English pyrogallic acid	12 grains
Glacial acetic acid	½ ounce
Water	4 ounces,

the bottle containing it being labelled "strong." An ounce or two of this is poured into another bottle labelled "weak," and is diluted with one and a-half or twice its amount of water. In cold weather, the amount of acetic acid may be reduced to two-thirds the quantity given above.

The *fixing solution* should be of cyanide of potassium about seven grains per ounce in strength; have in readiness, on the same shelf with this, a ten-grain tincture of iodine for use in the production of atmospheric effect, and for the removal of what is unnecessary in any transparency.

The *toning* of the slides is accomplished by one of the following solutions according to requirements of subject:—A one-grain per ounce of the developer as given above, a very weak solution of bichloride of mercury, and a solution of—

Chloride of gold	1 grain
Water	8 ounces

Many others have been tried, but were ultimately abandoned because of the fugitive nature of the effects produced. The only doubtful one retained is the bichloride of mercury; this, if a weak solution be used, followed by copious washing, does not occasion much cause for complaint; the beautiful blue tone it imparts to moonlight effects cannot be surpassed.

The *varnishes* required are of two kinds, viz.: a transparent one for the front glass or glasses of the transparency, and a ground glass substitute for the back one. Amber varnish, composed of gum amber dissolved in methylated chloroform, is most suitable for use in the first instance, being very free from structure. A few grains of white wax dissolved in this (as I have before stated) deadens the surface considerably finer than the finest French ground glass, and for the back one answers the purpose very much better.

Such are the formulæ—very antiquated some, perhaps, will say, almost like reading a page of the early history of photography, but, nevertheless, I think I may venture the assertion, after extensive observation, that the results produced by them have never been approached. Difficulties must be expected, for much depends on manipulatory skill; there are none, however, that will not be soon overcome by a little painstaking thought and practice.

A few accessories are necessary in printing which perform the duties of, and are much of the same character as, vignetting glasses; these were termed masks or "shades." In combining clouds having a chimney pot or other foreground with a sea view there will, of course, be a necessity for a delicate softening off of the cloud from the pots upwards, as likewise with the sea-view from its horizontal line into the sky, an even tint resulting when the two softened edges are superposed. For each of the above negatives a mask would be required, opaque at one edge, this opacity being gradually reduced to transparency at the centre of the glass. The best known method for obtaining one of these masks, perfectly graduated as specified above, is to procure a sheet of white blotting-paper on cardboard, and roll about half of it into a good sized cylinder, under the edge of which place a sheet of yellow tissue or other paper, and spread out upon that part of the paper unrolled. When this contrivance has been fastened with clips or pins, and placed facing a high side or other suitable light, with its flat yellow surface upwards and in a horizontal position, it will be observable that the yellow reflected on the lower portion of the cylinder merges by imperceptible degrees into that of the upper of white. If a photograph of this be taken, out of focus, with the twin lenses of the binocular camera so placed that the centre of the roll may occupy the centre of the plate, as well as fill it in length, it will, if conditions of light were right, be all one can desire. Masks for printing coloured glasses from can be made by placing two of the above face to face with the opaque side to the opposite edges, the centre being left quite transparent. These can be again copied for one opaque in the centre.

When the landscape is of very irregular outline, a piece of blackened cardboard is necessary, upon which temporarily fasten a rough paper print of the landscape, and cut out the cardboard to the outline. During the exposure of the cloud selected for the picture, use the shape to screen the light from those portions not required, taking care to move it up and down sufficiently to prevent any hardness. With the help of a mask already adjusted on the negative nothing need be allowed to print hurtful to the finished effect. This is what I designated in a former letter as "wafting."

Another kind of mask is one used for printing circular holes. For this a piece of cardboard a foot or so square should have painted in black upon its centre a good sized six or eight pointed star; the points should be wedge-shaped, and of considerable length; the longer and finer these are, the greater will be the softness produced. A pin having been driven through the centre of this drawing to spin it upon, it is ready to be photographed out of focus, and while spinning at a quick rate. The several uses of these masks will, I hope, receive attention further on.

Correspondence.

EMULSION IN INDIA.

Sir,—I have been asked to give my experience in working Liverpool emulsion, which I will do as concise as posible, and if you will permit the letter to appear in your columns, it will be circulated all over India, and save me an extensive correspondence.

I get the dry powder direct from the Liverpool Company. For every ounce of emulsion you require, weigh out 17 grains powder, soak for an hour or more in 3½ drachms absolute alcohol, 4½ drachms ether ·730, or 3 drachms 50 minims absolute alcohol, 4 drachms 10 minims ether ·725; or 4 drachms absolute alcohol, 4 drachms ether ·720 (ether ·750 is too weak). Shake up occasionally, and keep in the dark for at least twenty-four hours. I have not had occasion to use it longer after mixing than three months; it was then perfect, thermometer varying from 80° to 95°. Immediately before use, shake up well; and filter through four thicknesses of muslin—*Pugree Muslin*—called by some Mull muslin—is what I use. Clean the plates by soaking in

Nitric acid	1 part
Water	4 parts

Wash well, and dry with clean towels, not over the surface to be coated.

Spirits wine	7 drachms
Liquor ammonia fortis	1 drachm

Polish with carded cotton.

To coat the plates, pour the emulsion on like collodion in the wet process, only quicker and more of it, and at once pour back as quickly as you can. Rock the plate quickly and until set; when set, stand on corner to dry. This is effected in ten minutes to quarter of an hour. If you do not pour on and off quickly, the film dries with lines in direction of the pour. This is also caused by too much ether, so be cautious in India not to add too much, and when thinning after much use, and the emulsion gets thick, dilute with equal parts of absolute alcohol and ether ·720 do not dilute with weak ether.

Exposure.—With *very bright sun* with landscape having nothing particular in foreground, three times the exposure for a wet plate, or if you do not know what that is, give a view with Dallmeyer's rapid rectiliear No. 3 stop for plates 6 by 5 old style; 8 by 5 new lists, 15 seconds, or less; as foreground creeps in give twenty seconds or more. This in the plains with the thermometer 80° to 90°. On the hills give a minimum exposure of twenty seconds.

Before development edge with—

India-rubber	5 grains
Benzole	1 ounce

It is a good plan to go round the edge twice.

If you prefer a substratum, use—

Gelatine	1 grain
Water	1 ounce

Albumen *in all proportions* of water is useless. India-rubber substratum very troublesome. I, as you see, use neither, but edge.

Development.—Make and keep by you a mixture of—

Spirits of wine	1 part
Water	1 pint

Before developing and after edging, place the exposed plate in a small dish, and pour the spirits and water over the surface from a measure—do not mind the quantity—four ounces are better than one. The spirit must be *dashed all over the* plate; do not attempt to pour on and off; allow to soak from three to five minutes, not less than three. Pour off; and wash well in distilled water.

Now develop.

Solutions.

Pyro, (P) freshly weighed ...	8 grains
Distilled water	1 ounce
Bromide potassium (B)	100 grains
Distilled water	1 ounce
Ammonium (A), Liquor... ...	
Ammonia fortis	·880

If the picture has had ordinary exposure—that is, not over-exposure—

P	1 ounce

Pour on the plate, and leave half minute.

Into the measure drop—

B	1 drop
A	,,

Pour off P into the cup, mix, and quickly *dash* it on the plate; rock the plate about half a minute—and look. By Jove! it's done! Wash well, and fix—

Hypo	1 ounce
Water	4 ounces.

Next picture a little over-exposed—

P	6 drachms
Water	2 ,,

Pour on as before—also B and A.

Next picture over-exposed—

P	4 drachms
Water	4 ,,
B	4 minims

Mix, and pour on the plate, and leave half a minute.

Add, as before, one minim A, and try if all detail is out but image poor, which it will be with over-exposure. To the developer in the dish add ten drops of Abney's formula, No. 3, viz.,—

Citric acid...	60 grains
Acetic acid	30 minims
Water	1 ounce

Wash off slightly or entirely as you like; then intensify with—

P	3 drachms
Water	5 drachms
Abney, No. 3.	5 minims
Silver	5 ,,

(Nitrate silver, 20 grammes; water, 1 ounce),

more or less as you find the action gives intensity. Verdict: Not a bad picture; but you have cribbed all your formulæ! I have! I am guilty! For the strong developer I thank Colonel Stuart Wortley. Why not adhere to the formula given by the Company; surely they know best? Answer: They may know best; but I know in India it does not answer!

Some one wrote in your News that the strong developer did not answer well with Liverpool emulsion. I can only say for India—try it! I will undertake to fog a plate with the weak developer before I get anything like intensity. I will mix the developer strong, and permit you to try and get fog. I am coming home, and will let you try.

If I see this in print I shall understand you want more.—Believe me, yours very truly, F. Dawson,
Colonel Madras Staff Corps.

Secunderabad, Deccan, February 19th.

THE PHOTOGRAPHIC SOCIETY'S MANIFESTO.

Sir,—I read with great interest the manifesto of the Photographic Society which appeared in your last issue, but it was not without disappointment that I found no intimation of an intention to break new ground. The correspondence which has appeared in your pages on the subject of the education and authoritative qualification of photographers, as determined by examination and attestation by a competent tribunal, is a subject which I think might well have received the attention of the Society when preparing a new manifesto inviting photographers to join its body. Its existing aims and actions are, and have been, I believe, good so far as it has gone, but the Society has gradually dwindled, notwithstanding. Would it not have seemed wise, in the face of this gradual dwindling, to try to change or extend its aims and bases of operations? There is one very pertinent sentence in the document. After stating the advantages of membership as consisting in association, the privilege of attending meetings, admission to exhibitions, wall space for exhibiting free of charge (granted to outsiders on the same terms!) a presentation print (which is presented semi-occasionally!) and a copy of the Journal, the document runs: "To the comparatively modest rôle above indicated the Society is limited by the scanty list of its members. Members mean income and energy and power to augment usefulness." It is here admitted definitely enough that the aims and achievements of the Society are as yet very modest, and that there is room to augment its usefulness. Would it not have been wise to indicate some definite direction in which this usefulness would be augmented if members and funds were forthcoming? Would it not have been well to consider the subject of education and examination of photographers with a view to giving certificates of qualification?

If such a scheme were promised as soon as funds would permit, I sincerely believe that a large influx of working photographers would soon have joined the ranks of the Society, whilst at present they see insufficient advantage in return for their guineas.

I observed that at a recent meeting Captain Abney proposed that seven pounds should be handed over to the Society of Arts to be awarded in two prizes at an examination to be made under the auspices of that Society. This is so far so good, as that Society has machinery in operation for making technical examinations in art industries. But is it not in some degree eating humble pie for the Photographic Society of Great Britain to ask another Society to make technical examinations for it in its own art, and distribute its limited funds in prizes? Surely the Photographic Society of Great Britain should be a sufficient fountain of honour, and its certificate the most desirable a photographer could possess!

I am an old member of the Society, but, living in the country, I cannot always attend its meetings. I feel, however, a pride and pleasure in the community with distinguished photographers which such membership gives. I think that every professional photographer in the land should belong to the Society, which would then be strong at least in members and in representative character, and it is because I feel thus that I should like to see some step of a popular kind which would attract many now quite uninterested in the matter.—Your obedient servant,

An Old Member.

THE NATURE OF LIGHT.

Dear Sir,—Mr. Bovey appears to think that I was endeavouring, in my former letter, to prove Young's theory that red, green, and blue are the only primary colours. Such was not my object; and the arguments and experiments advanced were not intended to prove that Young was right, but that he was much nearer the truth than Brewster. The three primary theories have now, I imagine, as little weight in the scientific world as the fluid theory of electricity. All colours in the spectrum are primaries, and cannot be proved by any exact experiments to be compound. It must not, however, be supposed that, therefore, all tints resembling those of the spectrum are necessarily simple colours, as this is very rarely found by prismatic analysis to be the case; a blue, for instance, may be compounded of light of al colours, the blue rays, of course, being greatly in excess of the others.

Mr. Bovey's reasoning on the phenomena of rotating colour discs may seem plausible, but is nevertheless unsound, as I shall endeavour to prove. He is quite correct in stating that "a square-shaped body revolving at a rapid rate assumes the figure of a circle, and a jagged surface appears perfect and smooth"; but he is not happy in his explanations. I may here remark, by the way, that if Mr. Bovey means to assert that a black circular disc, when rotating, appears lighter, I shall certainly decline to agree with him.

The appearances first described are due to the fact that the impression of an image on the retina of the eye remains for some time after the object which has produced it has disappeared or become displaced, the duration of the persistence varying with the intensity of light. Mr. Bovey, it seems to me, completely ignores this fact, and attempts to explain the appearances he describes by rapidity of motion only, arguing that rate of motion renders it "impossible for a true transcript of a figure to be portrayed on the retina." How would Mr. Bovey thus account for the following facts? When an ignited piece of charcoal is rapidly rotated, the appearance of a circle of fire is produced, as is amply exemplified by revolving fireworks. In a rapidly revolving wheel the spokes are quite undistinguishable; but if, *during darkness*, the wheel be suddenly illuminated, as by the electric spark, the individual parts can be clearly made out. These experiments conclusively prove that the persistence of impressions on the eye is the true cause of the appearances described by Mr. Bovey, and also of the blending of colours on a rotating disc. However, without discussing this point further, it appears to me sufficient answer to Mr. Bovey's attempt to explain why a rotating disc, coloured in sectors of blue and yellow alternating with each other, appears white to the eye, that it is equally applicable to all colours. When Mr. Bovey has succeeded in obtaining white by the rotation of a blue and red or green and blue disc, I shall have great pleasure in admitting his explanation to be correct. The true reason why blue and yellow combined by rotation produce a white is because they are complementary colours, and other complementary tints will produce a similar result: for instance, red and greenish blue, or violet and greenish yellow, complementary colours being such as together produce white. Of course Mr. Bovey would not expect to obtain this result by mixing pigments, and there is nothing surprising in the fact that blue and yellow pigments mixed produce green, not white; under the existing laws of light the result could not be otherwise, as I explained last week.

The fourth paragraph of Mr. Bovey's letter I must pass over, as it conveys to my mind no intelligible meaning whatever. I need only remark that what I have written above with regard to complementary colours applies equally well to the lantern experiments I described last week.

As regards the instances named by Mr. Bovey of colourless liquids when mixed together producing brilliant colours, I fail to see what bearing they have upon the question at issue. New chemical compounds which did not exist before mixing give rise to the colours observed. The results thus obtained are in no sense analogous to those effects produced by mixing differently coloured liquids which do not combine chemically with each other.

I cordially agree with the concluding sentence of Mr. Bovey's letter, and on that account cannot accept his views on this subject in preference to the current scientific ones.—Yours truly, F. W. Reynolds B.A. (Cantab).

PERMANENCE OF DAGUERREOTYPES.

Sir,—The March (1877) number of *Chambers' Journal* contains an article on photography, in which occurs the following passage in reference to the Daguerreotype process:—"These pictures are by no means of a permanent nature, the action of the air contributing with other causes to tarnish the silver plate, and so gradually to destroy the image thereon." With all due deference to the Messrs. Chambers, they must allow me to dispute their assertion, and say a few words in defence of my first love. I believe that these are the only ones (where the process has been carefully and thoroughly worked out) of all the sun pictures which may looked upon as reliably permanent, and it is a great pity that the art which might be so valuable as a record to future ages should have been suffered to pass into oblivion. As a proof of permanence, I may mention that in passing through London *en route* to the Antipodes in September, 1876, my sister showed my wife a likeness I took of myself at Brighton in the early part of the year 1842, which was as perfect as when first produced. This, I think, is a tolerably good proof of the permanent character of these productions, although I am not surprised that a great many of them have come to grief, from what I have seen and read of the slovenly and inefficient manner in which the firings and washings have been done in this and kindred processes.—I am, &c.,

Dunedin, N. Z. J. C. Stephens.

WHITE PIGMENT PRINTS.

Dear Sir,—I see in your journal of Feb. 15th a notice, by Ernest Duby, of Th. Honikel's improvement in carbon printing by the use of a white pigmented tissue and printing from a positive, and I enclose a rough print made on a ferrotype plate, and a sample of tissue, both made last August for Mr. G. F. Pearsall, of Brooklyn, New York whose idea it was to make prints by this method on a black or coloured surface.—Yours respectfully,

Boston Mass., March 5th, 1878. E. H. D.

[Our correspondent, one of the most experienced carbon printers in the States, encloses an example of a white pigment print, one of the best we have seen. It has, however, the defect to which we referred in speaking recently of experiments in this direction. It is cold and unsatisfactory, from the black showing through the white, and depriving it of all warmth and richness.—Ed.]

Proceedings of Societies.

Manchester Photographic Society.

The monthly meeting was held at the Memorial Hall, on Thursday evening, the 14th inst., Mr. Alfred Brothers, F.R.A.S., President, in the chair.

The minutes having been disposed of, Messrs. Watson, Schofield, and Harrison Garside, were elected members of the Society.

Mr. Pollitt then exhibited a compact folding-stand for the camera.

Mr. Colin Mather showed a little cone-shaped camera for quarter-plates.

Mr. Schofield exhibited a collapsing lens mount which he purchased some time ago. He did not know the name of the maker.

Mr. J. Holding called attention to the fact that burnt-in pictures on wood fade or otherwise disappear under the action of sunlight; but when the surface of the wooden block was charred first, and the lights and middle tints obtained by scraping, fading did not occur.

Mr. J. Chadwick suggested that the fading was probably due to the falling away of the particles of carbon, caused by expansion and contraction, which would naturally ensue from exposure to the heat of the sun.

The Secretary showed some prints on Durand's matt paper, and said none but strong negatives would succeed with it.

Mr. D. Young exhibited one of Keevil's perfected lanterns, and showed its capabilities by exhibiting the Gabriel-Grubb series of pictures on the screen. The prism disc was quite equal to the direct one. Mr. Young produced the oxygen during the exhibition by means of his generator.

Mr. W. J. Chadwick then exhibited a microscope adapted to the sciopticon, using Mr. Woodbury's lime-light arrangement, and showed a number of objects on the screen. The microscope was very good as far as it went, but the lenses were not achromatic.

After the customary complimentary votes the meeting was adjourned. C. Adin, Hon. Sec.

Talk in the Studio.

Photographic Rays of Light is the title of a new quarterly journal devoted to photography in America, edited by Mr. Richard Walzl, editor of the *Photographic Friend*, which, having passed out of his hands, appears to have come to an untimely end. *The Rays of Light* are bright and genial, and we hope they may long emanate to enlighten and gratify photographers.

Photography under Difficulties in New Zealand.—A representative of Messrs. Burton Bros., photographers, Dunedin, has been camped in various directions among the West Coast ranges for over two months. With the fearful weather experienced of late, it may, says the *Times*, be imagined that in seeking the most picturesque spots of our delightful scenery, no small amount of discomfort has had to be endured by him. When camped at the head of the Waimakairiri during the recent floods, he had to undergo a short term of semi-starvation. He allowed himself to get reduced to one day's provision, and he had entrusted his horse to a friend to procure fresh supplies. The rivers rose in the meantime, and at the end of seven days there was no sign of the friend, the horse, or the tucker. Finding it impossible to reach any dwelling, he betook himself to the mountains, where he had espied one or two sheep a few weeks previous. After a day's hunt his famished maw was appeased at thee xpense of a neighbouring squatter, who was subsequently informed by the hungry artist that he would be minus one of his flock at shearing time. The said photographer has taken an immense number of views between Christchurch and Hokitika, particularly around the Otira Gorge. He intends to complete a collection of 600 to 700 views, after which he proceeds to Okarito to take the Waiho Gorge and glacier. The negatives have been forwarded by him to Dunedin.

To Correspondents.

G. G. Cooke.—The use of ox-gall with the colours, or a wall of ox-gall previous to commencing colouring, will generally remove all difficulty. Newman's "Preparation" answers well. Get from Newman, of Soho Square, "Harmonious Colouring Applied to Photographs," price one shilling. It will aid you.

G. L. R.—The acetate toning bath keeps well, and may be used over and over generally until it is exhausted. The addition of a little fresh gold is useful when the slow toning suggests that the bath is getting weak. It is not fit for use at first, until a day or two after it is mixed. The toning bath made by the addition of carbonate of soda to chloride of gold must be used just at the moment when it is ready. If kept too long it becomes inert; if used too soon, it bleaches the prints. It is generally ready for use about half an hour after it is mixed.

R. N.—We cannot give you a precise formula without knowing the quality of the pyroxyline. Some samples will dissolve as much as ten grains to the ounce of solvents without making the collodion too thick, and some samples will give a collodion too thick for use with two grains. About four or five grains should answer well with a good sample. Try it.

F.—A studio only fourteen feet long will be too short for card portraits, standing figures; but it will do very well for busts, which are now more in use than full-length figures.

Juvenis.—You may become a member before you are twenty-one if you wish. The entrance fee is one guinea, and the annual subscription one guinea. You may compound for life by one payment of ten guineas. It is necessary to be proposed by a member, and then ballotted for in a meeting of the Society. It rarely happens that an applicant is black-balled.

X. Y. Z.—There are lenses in which the chemical and visual foci do not coincide, but this is rarely the case with lenses made in the present day. If you have such a lens, the only plan is to allow for the amount of error after focussing. It is quite possible the error is in the camera-slide or ground glass. If the sensitive plate do not occupy precisely the same plane as the focussing-glass, the image cannot be sharp. Test for this error. First focus an image sharply on the ground glass, then remove it and place the dark slide with in it a piece of ground glass, or glass covered with matt varnish, or some equivalent, and drawing up the shutter see if the image is sharp on the plate of glass. If this is not the fault, it is of want of coincidence between dark slide and ground glass, a fault to be rectified by the camera-maker, or by yourself if you have any mechanical skill.

Perplexed must be more explicit. His question how to remove stains is too indefinite to enable us to give him any aid. What kind of stain, and from what are they to be removed? There are stains on linen, stains on woollen, and stains on character; ink stains, grease stains, silver stains, acid stains, and a score more. Many of them may be removed when their nature is known; but no advice can be given in the absence of information.

A Portraitist.—Your experience in miniature painting ought to be of some service to you as a photographic portraitist; but the examples enclosed are not satisfactory examples of art-treatment They are flat from bad lighting. You have too much diffuse front light, and this has a tendency to flatten the face, and destroy relief. There is also too much top-light, and this causes heavy shadows under eyes, nose, and mouth, and gives a coarse, sulle effect to the face. More side-light, and less top and front lights are needed.

Try-hard.—We prefer a collodion positive on glass, backed with dark velvet, to one on a ferrotype plate. The latter is much heavier in effect. A good collodion positive on glass, skilfully tinted, is a very pleasing kind of portrait.

John Harmer.—Many thanks. We shall be pleased to hear from you again.

John Lewis.—We have no fuller information than that given by our correspondent. Should any be published, we shall certainly reproduce it.

O. F.—Almost any of the well-known commercial bromo-iodized collodions will work well with a neutral bath when in ripe condition. There are some regularly advertised in our columns. The reason that names are not given you will readily understand. It would be invidious to mention special makers. The addition of a few drops of tincture of iodine to a colourless collodion is desirable if there be any tendency to fog when using it with a neutral bath.

Autotype Company.—Your letter received too late for insertion in the present number. In our next.

Bristol and West of England Amateur Photographic Society.—Copy of Mr. Brightman's paper arrived too late for this week.

Several Correspondents in our next.

The Photographic News, March 29, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Tinted Drawing Paper for Transferring Carbon Prints.—Electric Lighting.—The Last of the Scientific Exhibition.

Tinted Drawing Paper for Transferring Carbon Prints.—We have been trying some experiments recently with tinted drawing paper for the transfer of carbon prints, in a direction to which we referred a few weeks back in this column. A selection of papers of various tints was obtained, varying in coarseness, and these were then employed for the transfer of landscape pictures, both plain and vignetted. In the case of vignetted prints the effect is exceedingly good, for here the glaring aspect of a large surface of white is at once avoided, while in the case of the very high lights in the picture it is only by comparing them to white paper that their true tint can be discovered. Certainly, in nine cases out of ten, the improvement effected by a pearl grey background, or one of a rugged pale green, is beyond doubt, and where taste is exercised most happy results may be secured. The carbon tissue we have employed so far has all been of the same tint, namely, of a warm brown, or perhaps we should rather say warm black, and with this the most pleasant contrasts have been obtained upon drawing papers of a cold tone. There is no difficulty in the process of transfer. The first few sheets were passed bodily into a thin solution of hot gelatine, but in this case, it is true, there was a lack of adhesion to the films in some parts. By immersing the paper in warm distilled water first of all, and rubbing it while wet and warm with a tuft of cotton wool, all difficulty disappeared, and subsequent dipping in a warm gelatine bath was all that was necessary to transfer the tissue perfectly. In this manner we have transferred fifteen and twelve inch films without difficulty, and secured, as we have said, most pleasing pictures. We have not tried such papers for portraiture as yet, but intend to do so at an early opportunity. There is no doubt that in the case especially of large chalky faces or enlargements, a carefully chosen tinted paper overlaid with a tissue portrait of another shade would have a charming effect if managed with taste and judgment.

Electric Light.—Is electric lighting making way? The subject is being thoroughly discussed just now, but with all the talking there is something, apparently, that hangs fire. The electric candle, from which we hoped so much, has evidently gone out, and the lighting of our streets and bridges with the electric spark appears as far off as ever. Reports from Paris are not encouraging as to the future of electric lighting for every-day use. They have recently constructed an electric lamp in the vicinity of the *Grand Opera*, and the accounts of this are very discouraging. We are not aware of the nature of the light; but it seems fraught with all the disadvantages that have hitherto stood in the way of introducing electricity for our common wants, except, perhaps, that they do seem at last to have secured a constant spark, a difficulty that has existed for a long time in the electric lamp. The Paris lamp is said to be still as vivid in respect to its lights and shadows as ever, and there is not that distribution and softness that was promised by the electric candle. The light is so blinding, that looking in its direction the eyes are dazzled, while the shadows thrown are so pitch dark as to obscure everything within their limits. At the Trocadero, where the art portion of the Paris International Exhibition is to be located, the electric light is also employed at night to permit of work being carried on through the whole of the twenty-four hours, but this, of course, is not more than was done during the building of Westminster Bridge twenty years ago. Photographers have adopted the electric light, abandoned it, and now again taken it up. In this country it is employed for taking negatives, as in the case of Mr. Van der Weyde's studio; and in Berlin it is used for printing purposes. In both these instances the electric light seems to give satisfaction, but they are, we believe, the only two instances of the light being employed in an industrial manner. Other useful applications are in force. For lighthouses it has been employed since 1858, when the Dungeness Light first flashed the piercing ray across the dark waters of the Channel; and now our principal night beacons upon the coast are provided with the same vivid lighting. The Lizard in Cornwall, whose pair of tall white lighthouses are well known to all visitors in the district, have recently been provided with magneto-electric machines, and are now visible to the mariner at a distance of thirty miles away. There will be no need, therefore, to approach the dangerous coast in that part too nearly, in the case of vessels working up the Channel, for having once sighted the twin lights, their whereabouts is at once apparent without venturing nearer. In cases of this kind a light cannot be too vivid, and now that so piercing an illumination has been secured, Sir William Thompson, the well-known electrician, wishes the Board of Trade to go a step further, and cause all lighthouses to signal their own name. In the same way as we telegraph by means of dots and dashes along a wire, so it is possible to signal by light, flashing short and long signals. Thus as a dot followed by a dash is the signal for A in the telegraph code, so a short flash followed by one of longer duration means the same thing. E is represented by one dot or flash, while N is the reverse of A, and so on. Sir W. Thompson desires to see every lighthouse flash its initial letter, at intervals, say, of once a minute. In the case of the Dungeness Light, for instance, the lantern would shine steadily for a minute, and then be obscured for a few seconds, after which it would signal the letter D—one long flash followed by two short ones—and then commence shining again. Already we are told a lighthouse on the Scotch coast has adopted the suggestion, and signals every minute the first letter of its name, to be read by all who are interested in the matter. On our coast, it is said, the sailor need never go out of sight of one lamp without entering the zone of another, so that if these were all provided with signalling lamps, the master of a coasting vessel could tell the places he passed as well by night as by day. The last important application of the electric light is that adopted in the British navy, and to which we have already referred in these columns. The finest men-of-war are now fitted with the electric light, the "Alexandra," "Téméraire," and "Minotaur," in the Mediterranean fleet, being provided with this powerful means of illumination and signalling. The "Alexandra" is Admiral Hornby's flagship, and the "Minotaur" that of Lord John Hay, whose ships that formerly composed the Channel squadron have now joined the Mediterranean fleet. No doubt in a little while the electric light will appear on the bridge or masthead of every battle-ship in Her Majesty's navy. Signals can be passed by its means for miles and miles quite as rapidly as they can be sent by telegraph. For lighting up the neighbourhood of the ship at night, and detecting the approach upon the water of small torpedo boats, the electric ray is also likely to render useful service in the navy.

The Last of the Scientific Exhibition.—We have not yet heard the last, it seems, of the unfortunate "Loan Exhibition of Scientific Instruments" that was held at South Kensington a little while ago, when the education and improvement of the masses was taken in hand by a party of philanthropic gentlemen, anxious to communicate their pent-up knowledge to the outside world. Of course, we do not know to what extent the outside world benefitted by the organization, and probably never shall. But from certain "grave irregularities" which the committee of public accounts have discoverd, it seems certain that benefits have been conferred upon somebody, and as rather large sums have been expended, it is obvious that these benefits bestowed by the Exhibition must have been material and many. We were wrong, therefore, in our former opinion about the Scientific Exhibition when we said no one was likely to feel its beneficial influence.

NON-CONVERGING PERPENDICULARS IN ARCHITECTURAL PHOTOGRAPHS.

BY EDWIN COCKING.*

A STATEMENT has very recently been put before the photographic world which challenges one of the most important laws regulating architectural representations. It is to the effect that vertical lines are not seen parallel to each other, and, consequently, photographers need not attempt to make them so. Now, if this assertion is accepted, and acted upon, photographic delineations of buildings will be liable to the suspicion that truthfulness in them is an impossibility.

As I think that the conclusions drawn from the theory propounded arise from a misconception of the laws of perspective and the reason why they exist, I propose to say a few words which may help to place the matter—viz., the absolute straightness of perpendicular lines in views of buildings—in a familiar way that may be easily understood.

Now, the first thing to be done when the artist begins his work is to establish the station-point of view—that is, to fix how much of the subject he intends to depict. It is absurdly evident that no one can look either straight before him, or upwards, or to the extreme right and left, at the same moment of time; therefore, it has been found that the field of view may be determined by an angle of 60 degrees—that is, 30 degrees all round a centre, starting from the eyes; this is, theoretically, the limit of view, but practically a few more degrees are allowable. If a cone of cardboard 9 inches long and 6 inches wide be held before the eye, what is seen through the opening will define how much pictorially may be rightly represented; and the amount, whether the whole or part of the building is to be shown, will then depend upon the distance at which the station-point is fixed. Having settled this matter, the centre or axis of the cone must be held perfectly level, forming a right angle with the vertical lines of the building. In this position all perpendiculars seen through the cone, whether they are situated near to or far away from the station-point, will be parallel to each other and to the face or front plane of the cone; but if, when too close to the building, the axis of the cone is lifted in front, in order to see the top, then the plane of the cone and the plane of the vertical lines of the building become relatively altered, and are no longer parallel with each other; so that what were hitherto perpendicular lines become now absolutely horizontal, as seen through the cone, and consequently are amenable to the laws relating to horizontal lines when in perspective.

The deduction to be drawn from this is, that as the plane of the cone—or, as we will now say, the plane of the artist's drawing—cannot and must not be in two positions at the same time, no pictorial representation is truthful where it is attempted to show vertical lines upon different planes, amounting, in fact, to an attempt to produce one picture upon two pieces of paper where one is flat and the other tilted. And it is just this idea of the plane of the picture being movable that I take to be the main point upon which a misconception has arisen in the statement referred to. It is also argued that the laws of perspective, if carried out, would necessitate that vertical lines should lean towards each other; and, as a proof, it is assumed that a square tower 200 feet high and 40 feet wide must be depicted narrower at the top, because there the building is further from the spectator than the lower part on the ground.

Now, as this possibility of the top of a high building appearing actually narrower than the base has no doubt often occurred to photographers, it will be as well to examine into this special matter more closely. First, then, what is perspective? Stated in a plain and simple way, it is the means by which, on a perfectly flat surface, objects both far and near can be depicted correctly and precisely in the same relative position that they bear to each other. What such a view should be when shown upon a flat surface, when parallel to vertical lines, we have before us every time we look out of a window, for there, apparently, is depicted a picture; and by keeping the eye at a fixed station-point of distance from the glass this picture can be outlined with white paint, the result being an absolutely literal transcript of the objects seen, both vertically, horizontally, and in perspective. Now, it is from a consideration of the reasons why this natural picture on the glass is found to be true, that certain geometric deductions have been laid down, and which constitute the laws of perspective; so that, with the aid of these laws, we can produce a true representation of any building on an opaque flat surface.

Having, then, shown that the station-point of distance from the building, and the parellelism of the vertical plane of the drawing board, or window, with the vertical lines of the building, must of necessity be strictly attended to before a single line of imitation is attempted, and as in the statement referred to the writer says, "There is no reason why the laws of perspective should not affect objects more or less distant in a vertical direction in just the same way that they do those in a horizontal direction," I will now endeavour to show that perpendicular lines do not converge, and that, consequently, vertical perspective does not exist.

We will return to our window, and imagine that right opposite to us is a street 600 feet in length, at the end of which is a tower 200 feet high and 40 feet wide. With the eye fixed in one place at a distance from the window about the length of the cone, paint the outline of the tower upon the glass, and then measure the same, and it will be found that the two perpendicular lines are perfectly straight, that they are as far from each other at the top as they are at the base, and consequently do not converge, although the top of the tower is farther from us than the base is. The reason why this must be so will now be explained. Suppose we attach wires to the two top corners and the two base corners of the tower, and bring them altogether to the station-point where the eye is fixed; if then from the two upper wires other wires are suspended at equal distances from the eye, these wires will be true vertical lines, being perfectly parallel with the plane of the window or drawing-board; and supposing that a series of similar wires were suspended all along the distance between the tower and our station-point, these wires when looked at on either side must coincide, and will eventually intersect the outside vertical lines of the tower. In bringing the eye back again these wires would also represent a gradual reduction in size of the tower, and be geometrically perfect in the relation of one wire to another, so that when they arrived at the window we should find that the vertical lines were perfectly parallel with each other. Therefore, a true representation of the tower, as far as its vertical side lines are concerned, is nothing more than a section of the space enclosed between the two vertical wires (wherever they may be) cut off parallel with the plane upon which such representation is made; and whether we cut off a small section, as seen on the window, or a large one further off, the distance apart of these suspended vertical lines must always be equal, and so cannot diverge.

The same natural law or result can be illustrated in a very marked way by supposing that the tower is brought 300 feet closer, thus increasing the angle of view to more than 60 degrees, with the plane of the window-glass still parallel with the perpendicular lines of the tower. By keeping the eye at the station-point of distance, we paint the outline again upon the glass, and, although the top is now still farther away compared with the base than it was in the first instance, still the lines upon the glass will measure equal distances apart as they did before. Thus even in this extreme case the vertical lines do not converge.

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* Read before the Photographic Society of Great Britain.

Precisely the same thing occurs when depicting horizontal lines not in perspective, but *parallel* to the plane of the picture, as when looking at a row of houses on the opposite side of the way, and extending sideways to one side of our picture. Here, although the roof-line appears to converge, the true representation of it must be perfectly horizontal or straight, because the same law rules here as in the case of perpendicular lines, viz., that a true representation of the roof and ground lines, being horizontal, is nothing more than a section of the space enclosed between the two horizontal wires, wherever they may be, cut off *parallel* with the *plane* upon which such representation is made.

I will now illustrate, in this gallery, the result of horizontal lines seen under the conditions just named; and by parity of reasoning it will be evident that the same result must follow in the case of perpendicular lines.

I look at the cornice line of the ceiling on the opposite wall, and turning my eye along the whole length of the room, the line appears to be depressed, or converging. I hold a sheet of glass quite vertically, and also *parallel* to the *plane* of the opposite wall, and keeping my eye at a fixed distance from the glass, I trace the cornice line throughout its entire length, and you see that the result is a perfectly horizontal line, being at right angles with the perpendicular edge of the glass, and so it becomes a true representation of that side of the room, so that not only vertical, but horizontal lines, when parallel to the plane of the picture, are not subject to any convergence or depression of position.

The examples I have given also illustrate what I first alluded to, the importance of the station-point of distance, because in looking at a picture, the distance that the eyes should be from it is regulated by the angle fixed upon for the amount of subject included. Now looking at the outline on the glass of the tower at 600 feet distance, which is represented through an angle of 60 degrees, any distance may be chosen outside nine inches; when the tower was only 300 feet off, the angle being more than 60 degrees, the eyes must be fixed at the nine inches distance; and when, as in this room, the angle is 90 degrees, then the distance from the picture must be less than nine inches; so that it is only when viewed from the proper point of distance that the picture is perfectly like what the original appears to be. Thus, with the eyes as close to the glass as they were when the cornice line of this room was depicted, the line which is actually horizontal or straight will then appear to converge the same as the original.

It will have been noticed that I have carefully refrained from alluding to photographic representations in any way. This has been done purposely, because the conditions under which the photographer works are so totally different to those I have described as appertaining to the artist that no comparison can be made between them. For instance, the photographer does not cut off a section of the wires, or, as we must now say, the rays of light, running between the object and the station-point. The image has first to repeat itself, and, as it were, begin its existence over again, and what this new existence is to be must be dependent upon the perfection of the optical and mechanical instruments used to produce the second image. Therefore the application of this matter of the laws of perspective lies in their results being accepted as standards of right and wrong; but, having this knowledge to assist him, the photographer will be expected and required to use all the skill he possesses to realize the conditions laid down, so that the representation he produces may be accepted as perfectly true both in its pictorial and relatively scientific aspect.

The following report of the discussion is from the Journal of the Society.

Captain ABNEY observed that the whole secret of perspective seemed to be in the use of the vertical plane, but it required a physiologist to tell us why that plane was chosen. Possibly it had something to do with the axis of the eyes.

The PRESIDENT: All vertical lines are vertical to nature.

Captain ABNEY said it all depended where we were looking. If he were lying down at an angle of 30°, would the lines then be vertical? As a geometrician he could draw a picture on any plane, and at any angle. It was a matter of conventionality that had fixed the vertical plane as the one on which pictures should be drawn.

Mr. F. BEDFORD thought it was a great question whether Mr. Cocking was right on one point. When he followed the line at the side of the room in his example, he moved his head, and the line could only be seen as straight when he did so. The effect really was the same as that produced by the pantoscopic camera.

Mr. COCKING observed that that was the point on which he laid stress. When studying at the Royal Academy, he remembered it was laid down by the instructor, Mr. Knight, that the true representation of an object was not its actual appearance. Now, in looking along the line of the wall, he did not turn his head at all, only his eyes, the head representing the station-point.

The PRESIDENT: What applies to horizontal perspective applies to vertical; but there is no such thing as vertical perspective, as the moment you alter the parallelism of the planes the whole thing is altered.

Mr. COCKING concurred.

Mr. WOODBURY contended that in the glass as held up by Mr. Cocking both ends were in perspective.

Mr. COCKING: Certainly not.

Mr. WOODBURY: They are farther from the eye than the centre.

Mr. COCKING: If you admit that vertical lines come in perspective, it follows that from your horizontal points they go upwards and downwards.

Mr. WOODBURY: The top and bottom are farther from you, and therefore appear smaller to the eye.

Mr. SAWYER observed that the article he recently wrote on the subject had given rise to the paper. He would not, however, then discuss point by point with Mr. Cocking, preferring to see the paper in print. What he said was simply this: If you take your stand at the bottom of a street and look down it, you notice that the sides gradually approach until they come to a converging point. He carried that reasoning further, and held that if you stood at the foot of a tower and looked upwards, you saw also the lines of the tower recede from the eye until they also came together. Now, supposing the tower was two hundred feet high, and the camera be placed at such a distance so that the whole be brought into the field of view covered by the lens, he maintained that, supposing the lines were vertical, the camera being farther from the top than from the bottom, the lines as presented by the camera must necessarily converge. The mistake was in attributing to the camera only the same range and the same amount of subject as seen by the eye, because, in looking at the tower, the eye only saw a very small portion at a time, and it had to roam up and down in order to get any impression of the tower at all; consequently, lines appear straight, though in reality they are not so. Mr. Cocking had mentioned an experiment with wires, and he had put the spectator at some considerable distance from the tower in his illustration; but the principle was the same, though the amount of the convergence was so small it was impossible to detect it. He thought an experiment to prove this could be very easily carried out, and he would undertake at the next meeting to bring an example which would decide whether his or Mr. Cocking's views were correct. He would put on a wall of some high room a sheet of white paper whose sides were vertical, and at one-third of the height (?) place a camera perfectly level, and he thought it would be found that though the lines were vertical, they were in the picture smaller at the top than at the bottom. (A Member: No.) Well, that remained to be seen. If the distance from the bottom is greater than that from the top, then the bottom will be smaller. If the camera be placed exactly in the middle, then both the top and bottom will be smaller than the middle. He saw the opinion of the meeting was dead against him; nevertheless, he held to his own views.

Mr. HUGHES observed that the planes being parallel, vertical lines must also be represented parallel.

Mr. F. BEDFORD pointed out that although it was true that in the case of the tower the top was farther from the camera than the bottom, it must be remembered that to represent it correctly the swing-back must be used. The plane of the delineator must be parallel to the object represented. As regarded the eye, it subtended about thirty degrees, but it was always rolling; and for the time being, only represented the vertical lines towards which for the moment it was turned. When looking along the side of a wall the eye turned itself round and adapted itself immediately to the horizontal line. In drawing, the whole principle of vertical perspective is based upon the theory that the eye is actually parallel to the object represented. This was not always the case, but the distortion was corrected by the knowledge that the objects are true, and that the planes must be parallel.

Mr. Woodbury: If you lie on your side you have no parallelism.

Mr. S. Davis remembered in joining in a similar discussion some years since, when Baron Pollock was presiding, and the view he took of the matter was that the size of every object corresponded to the angle in which it was viewed. Take the case of the Victoria Tower. The top of the tower being considerably farther from the eye than was the bottom, the angle subtended of the latter in the eye will be much larger than in the former case. If then the extremities be connected, the lines will be found not to be parallel. But this in a picture would be extremely unpleasant to the eye, although as a matter of perspective it would be quite correct.

Captain Abney thought that one point had been lost sight of, and that was, that as a rule we did not see true perspective in a picture, speaking, at all events, of photographs. Unless the eye was placed from the picture at the same distance as the focal length of the lens, the same view of perspective as in the view itself could not be obtained. This was why the views taken by a wide-angle lens appeared false. It was impossible to look at anything at so short a distance as five inches, the focal length of some of these lenses. If the photograph be looked at at nine inches focal distance, the lines of the picture would occupy the same angular position as that occupied by the view itself. The perspective would then be found to be perfectly true, and the vertical lines, if measured, found to be absolutely parallel, though when looked at from the proper focal distance they would appear to converge.

Mr. W. Bedford did not quite agree with Captain Abney, as in that case copies of large views would be false; the distance from the view, he thought, must be taken into consideration. If the eye were placed at a distance of the focus a correct idea of the size of the subject would be obtained, but the perspective would be still correct if this size were reduced, and it was looked at as a small picture.

Captain Abney: The perspective would be correct, but you would not see it properly. Whether increased or diminished, you must see it at the focal distance. This is the great advantage of enlargements.

After a remark from Mr. Bird,

Mr. Cocking said the matter could be expressed as a rule-of-three sum. As the eye was to the drawing or photograph, so was the drawing to the view given. If a tall tower was to be drawn, it should be drawn with perfectly parallel lines, because the drawing was in a parallel plane; but directly the eye was moved from this plane, the conditions were not the same. Looking up, for instance, it would seem narrower. The whole law seemed to lie in this.

Mr. York had noticed the convergence of the lines in a tall tower. He had taken a view of the Westminster, with a six-inch focal lens, standing at a distance giving an angle of forty-five degrees, but had not seen the convergence spoken of by Mr. Sawyer. If the subject were to be discussed at the next meeting, he would bring some examples in which this convergence did not exist. The camera, of course, should be perfectly level. A swing-back he never used.

Mr. Vernon Heath drew attention to a photograph on the wall of a large building, which was taken for the purpose of testing a Steinheil lens. In this photograph not the least convergence could be discovered.

The President said he recollected some years ago writing a treatise upon this subject. All vertical lines in nature must be vertical when depicted on a vertical plane. A view as seen through a pane of glass was really what a picture represented. He thought perhaps the best way would be to adjourn the discussion until the next meeting, when Mr. England would read a paper on dry processes—a subject which would be in accordance with the offer which had been made that evening.

It was then decided to adjourn the discussion until the next night of meeting.

PHOTO-PRINTING IN NATURAL COLOURS.

BY PROFESSOR J. HUSNIK.*

The visible pictures thus obtained are fixed by a strong solution of ammonium-sulphocyanide, but must be first thoroughly washed.

When the proofs have lost their opalescent look, and appear perfectly transparent, they are again thoroughly washed, and then placed in an intensifying bath, which is prepared as follows:—200 c. c. of water are poured into a trough, and the following four solutions successively added, the whole being kept constantly stirred;—(1) 16 c. c. of a solution of 20 grams of pyrogallic acid in 100 c. c. of water; (2) 20 c. c. of a solution of 20 grams of citric acid in 100 c. c of water: (3) 8 c. c. of a solution of 20 grams of carbonate of soda in 100 c. c. o. water. When these have been thoroughly mixed, (4) 16 c. c. of a 1 per cent. silver-nitrate solution are gradually added, still continually stirring.

After being intensified, the proofs are left for an hour in water, and, as a precautionary measure, fixed for about three minutes with a solution of sodium-hyposulphate, and then again rinsed in water from one to two hours. They are now finished, and can be dried and varnished. To prevent mistakes, the colour of the glass under which it has been exposed should be noted on each negative, and, as already explained. the complementary colour must be used for printing with. Printing over each other with red, yellow, and blue will produce all the natural colour tints.

Subsequently to the publication of the above-described process, Ducos du Hauron has introduced modifications, which he maintains are great improvements, as by them he has succeeded in considerably reducing the time of exposure. In 1874 he recommended the addition of corallin to the collodion for the negative to be taken under the green glass; and in 1875 he advocated the use of chlorophyll as a colouring matter for the collodion to be used under the orange glass. Corallin he adds directly to the collodion, but chlorophyll he first dissolves in spirit, and then pours it immediately before the exposure on the prepared plate. His collodion is mixed with a 3 per cent. bromide salt only, and can be used for all three monochromes. The plan of intensifying the visible picture, as explained above, he has quite given up, and replaces it by that of the alkaline development of the invisible image.

These improved methods have been fully described in a brochure published by Eug. Dumoulin in 1876, under the title of "Les Couleurs Reproduites en Photographie." Though I have not myself practically worked this process, I can scarcely trust the results which have been obtained, as I have already often made attempts with coloured collodion without obtaining any reduction in the time of exposure. In this I am borne out by M. Jaquard, a Frenchman studying photography with Herr Albert, in Munich, who has repeated the experiments without any good result. He was compelled to adopt quite a different way to obtain a monochromatic negative for the blue picture. From him, too, I learn that the firm of Marion, in Paris, had been working Ducos's process, but had met with the same difficulties in the negatives taken under the green and orange coloured glass; the same negative is obtained as that under the violet glass, which is intended for printing with the yellow colour.

My own experiments serve to convince me that the time of exposure to the red and yellow rays could be shortened in a much simplier way, and that without materially altering the method which I have already adopted. By this means, too, I found I could obtain negatives which were completely correlative with the intensity of each particular coloured light.

It has been often asserted, but never actually proved, that an after-exposure to the red and yellow rays will intensify a feeble action of the blue or violet rays on the film of silver iodide or bromide, so that its intensity shall correspond with the degree of exposure. On the other hand, I am in a position to maintain that *all* the haloid salts of silver possess in a high degree the property of being *sensitive to all the other rays after a short pre-exposure to the blue rays.* By help of this fact, not only can we reduce the time of exposure to a minimum, but we have also the full effect of those rays alone which penetrate through the coloured glasses, and thus we obtain the required negatives.

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* Continued from page 124.

If fluorine be one of the halogens thus employed, care must be taken to combine only sodium fluoride with sodium iodide, bromide, or chloride, as all other metals yield insoluble compounds with it. A plate prepared with either of these silver salts should be exposed for a short time under a blue glass; it will then, after a short exposure to monochromatic light, when developed by the alkaline method, produce a corresponding negative.

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ON THE PHOTO-CHEMICAL PROPERTIES OF SILVER-IODIDE.

BY DR. J. SCHNAUSS.*

In the preparation of all kinds of dry plates, however much the various processes may differ among themselves, we meet with two important conditions which must be complied with, namely, the removal, as far as possible, of all silver nitrate, and the employment of a preservative; both of these conditions are unknown in the wet plate process. And here, also, we have a confirmation of the hypothesis that notwithstanding all the washing with water, a trace of silver nitrate is still left, for by chemically removing—or, more properly, decomposing—it, the sensitiveness to light is in this case also destroyed. In many of the older dry processes—that of Taupenot, for instance—after first preparing and silvering the paper, its sensitiveness was destroyed by the addition of potassium or ammonium iodide to the albumen preservative, so that it could be manipulated and kept without any special darkening of the work room. But even here we must not go to the extreme of carelessness, for direct sunlight is so many times stronger than that refracted through the photographic lens, that at last even insensitive silver iodide will change colour. The dry plates are, when necessary, again sensitized by a bath of aceto-nitrate of silver, which itself must be immediately washed off with water.

To preserve, as far as may be, the sensitiveness of the film of silver-iodide, it must be rendered as porous as possible. This is effected partly by the employment of a peculiarly prepared pyroxylin, partly by the addition of a substance which will make the film permeable (such as resin), or of some hygroscopic body. As all trace of silver nitrate must be got rid of, in order to avoid crystallization, tannic or gallic acid should be added to the preservative solution. This will have the additional advantage of absorbing any iodine which may have been set free.

Dry silver iodide plates, after being exposed, may be so far developed by a neutral or alkaline solution of pyrogallic acid that a faint image may be detected. This can even be effected by means of ammonia alone. But of course this scarcely perceptible blackening of the particles of silver iodide will not suffice for a negative, and the development must be completed by acid pyrogallic solution with the addition of some silver nitrate. The latter serves to intensify the negative to the required degree by means of the molecules of metallic silver been separated by the pyrogallic acid; they are attracted by the particles of silver iodide which, after exposure, are invisible in the wet process, but in the dry are quite perceptible. There are, however, some cases where the exposed silver iodide, curiously enough, loses this property; more especially the phenomena of so-called solarization (according to Sutton the "reversed action of light"), and of direct transparent positives. For the latter there is, unfortunately, no better name, though the meaning may be easily mistaken.

Possibly both phenomena are due to the same cause. As far as I know, the direct transparent positives have alone been investigated, and that by Dr. Sabatier and by Window. According to Professor Vogel (*Lehrbuch der Photographie*, page 67, second edition), the reason why the silver atoms reduced by the developer are precipitated on the particles of iodide which have been unaffected by light may be thus explained. The partially developed negative attracts the precipitated silver more powerfully in those parts which have not been covered by the latter during further development, and which, consequently, were the most exposed to direct illumination; and yet Professor Vogel also obtained direct transparent positives by treating a plate of silver iodide, which had been exposed and afterwards washed, with a mixture of arsenite, arseniate, and carbonate of sodium. The developer produces a positive on the already blackened plate. Under the term developer in all these cases must be understood pyrogallic acid, and not iron sulphate; it is also to be noted that, according to Dr. Sabatier, all the solutions should be as neutral as possible, and that the collodion should be cadmium collodion. All that is known of the phenomena of solarization, which often occurs in the sky of landscape photographs, is, that the red brown spots which appear (also in dry plates) under the pyrogallic developer cannot be further intensified.

In his "Dictionary of Photography," Sutton says, on this point:—"Sometimes, through over-exposure, parts of the negative which should be most transparent come out perfectly opaque. This is called the reverse action of light. It occurs often when the bath contains free nitric acid. In every process the exposure must be regarded as the first step to this action of light on silver iodide, and if it were continued long enough, probably in all cases there would be a complete reversal of light and shade. This reversed action can be effected by exposing a plate for one or two seconds to diffused light after pouring the developer over it."

If, as is very probable, the latent or invisible image on the silver iodide be produced by light in consequence of reduction, it is not difficult to see how an over-exposure may carry the reduction so far that the reduced silver can have no longer an affinity for the nitro-pyrogallate of silver. When, by the excessive action of light, the developable substance in the sensitive film is reduced nearly to a metallic condition, it is easy to understand that a limit is put to further reduction."

By the above mentioned experiment with after-exposure is evidently meant the phenomenon of direct transparent positives, and yet, according to all experience, this is by no means identical with over-exposed or solarized plates, but, on the contrary, is rather produced by such exposure with a longer use of the pyrogallic developer. To the younger generation of photographers, who develop their wet plates only with iron (their dry plates, unfortunately, not at all), this phenomenon will probably be a *terra incognita.*

Black Finish for Brass.—Optical and philosophical instruments made in France often have all their brass surfaces of a fine dead, black colour, very permanent and difficult to imitate. The following, obtained from a foreign source, is said to be the process used by the French artisans:—Make a strong solution of nitrate of silver in one dish and of nitrate of copper in another. Mix the two together and plunge the brass into it. Remove and heat the brass evenly until the required degree of dead blackness is obtained.

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* Continued from page 125.

The Photographic News.

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PERSPECTIVE IN VERTICAL LINES.

It is recorded of a certain geometrical draughtsman that he drove himself mad in the endeavour to find out a rule for putting rams' horns into perspective. The bewildering discussions which arise in the Photographic Society, whenever much simpler questions of perspective arise in the meetings, seem well calculated to drive a geometrician wild. Perhaps the most humiliating manifestation of thoughtless unacquaintance with elementary rules ever witnessed in a learned society was displayed at a meeting of the Society nearly eighteen years ago, when a paper by Mr. Rothwell elicited a discussion on plane perspective. The discussion of the last meeting of the Society has the merit of being briefer than that to which we have referred, and was possibly a little less confused. The laws of perspective are simply geometrical facts, and do not admit of opinion at all. The confusion generally arises from attempts to apply rules in inapplicable, or, indeed, impossible conditions. The draughtsman to whom we have referred in our opening sentence tried to settle a rule for putting into perspective a column as seen with the spectator close to it—a condition involving looking in two directions, up and down, at once! We were reminded of this attempt during the discussion at the Society. A clear apprehension of the bases of plane perspective would remove any chance of misapprehension. The delineation of objects in perspective is upon a vertical plane, placed between the objects and the eye. The visual rays form straight lines, which might be represented by threads or wires between the object and the eye. The plane of delineation cuts the pyramid formed by these lines, the size of the picture being determined by the point of intersection. Vertical lines in an object must be correspondent to vertical lines in a plane parallel to it. It is clear, then, that vertical lines in the object to be delineated must be rendered by vertical lines in the plane of delineation, whether that plane be the picture formed by a section of the pyramid, or the retina, so long as it is parallel to the object.

But it is contended by those who have not thought the subject out, that all receding lines appear to converge, and that the vertical lines in a tower appear to converge, and must therefore be rendered as converging. This is perfectly true if the head be thrown back to look upwards at these lines, and they will appear as converging on the ground glass if the camera be cocked to take in the whole height of the tower. But in this case neither the eye nor the plane of delineation is parallel with the object. If the ground glass or sensitive plate, constituting the plane of delineation, be, by means of a swing-back, placed parallel to the object, then convergence ceases, and the plane being parallel the upright lines are rendered by upright lines. As Captain Abney mentioned, to view a photograph correctly it is necessary that the eye should be placed at the same distance from the picture as the lens was from the sensitive plate. He might have taken the matter a step further, and pointed out that if the lines converge, from the plate having been non-parallel to the object, this convergence might be corrected by placing the picture at a similar angle to the eye which the plate occupied to the object. A very interesting experiment of this kind may be carried out by the aid of a stereoscope. Take an architectural stereograph, and incline it backwards and forwards; the lines may be made to converge, or diverge, or become upright, just in relation to the position in which it is held. At the discussion of this subject in November, 1860, the late Chief Baron Pollock, then in the chair, mentioned a geometrical toy, called the Horizontorium, made for the purpose of illustrating plane perspective, by which a diagram drawn in distorted lines could be seen in accurate perspective by altering the angle at which it was viewed. But it must be remembered that to see the perpendicular lines of a tower remain perpendicular and show no convergence, the parallelism of the eye and tower must be preserved. The moment the head is thrown back to form an angle, the vertical lines really become receding lines, and the laws of horizontal perspective come into operation, the receding lines appearing to converge.

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REPOSE, SIMPLICITY, AND REPETITION.

BY W. HEIGHWAY.

To no very great extent can action be simulated in the photograph. No doubt, with capable models and a genius of a photographer, more of movement and life might be attained, but the "coming man" has not yet arrived, nor has he even sent his card.

Is it necessary to say, parenthetically, that this is a little bit of pleasant sarcasm?

The historical painter may for awhile breathe freely. He may tread ground where the photographer dare not follow, and soar into the realms of the ideal, whilst the soul of his rival is fettered and confined to the representation of the real and the palpable.

For the photographer to attempt more, is to court ridicule, however successful he may deem his own efforts, because we *know* he is but juggling with us.

It is not to say that the photograph need be a hard, literal, absolute *fact*, but it must at least bear the impress of *truth*, and between these there is more than merely the difference of two words. A fact is a reality, a something done or existing; but truth is wider of significance, a more generous quality, and may exist without absolute conformity to fact.

To introduce any discordant element into a photographic picture destroys at once all repose and sense of fitness, without which it cannot give pleasure. Nor must the photographer chafe at this circumscription of his art. He is only to be deemed unsucessful in its exercise where he fails to attain to the possible; but he challenges ridicule and courts unsuccess where he attempts more.

Repose, then, is as much to be considered an attribute of the conception of a picture as a fitness in carrying out this intention; a quality of the art-consciousness as much as of manipulative skill.

Don't attempt sensational tricks. There is quite enough in nature worthy the highest genius. A dodge—even a successfully executed one—cannot ever satisfy the intellectual eye. It may, perchance, catch the transient wonder and admiration of fools, but no more. Surely that is a feat unworthy the care and labour of the artist!

Simplicity—artistic simplicity—is one of the most powerful qualities of a picture, giving the idea to the spectator of reserved strength, a power held well in hand. Ingenuity is ever apt to get involved and obscure. This we may often discover in the comments of critics, whose opinions as to the true meaning of a work not only differ from each other, but are often all very foreign to the meaning of the artist.

You cannot by any force of ingenuity transform the humble but toothsome bird that is so happily associated with apple sauce, into a swan; nor is the art swan to be manufactured. Ingenuity in art is all very well, but don't let it carry you away.

At first sight it may almost appear that simplicity and uniformity are antagonistic to variety, but that is not so; the repetition of a form in a composition often has the effect of heightening variety, and this, too, in the most harmonious manner. Most useful in the posing of groups is this power.

Again, it has especial value in emphasizing the motive of the picture, fulfilling the same purpose as the iteration of a phrase in a poem or a piece of music. As you study the works of great painters you will find how much advantage they have taken of this principle.

The sense of completeness so necessary to a great work of art is the outcome of this repose, and perfection is not to be attained without it.

The idea of completeness must be given to the beholder —not, let me be understood, that the story is to be laid bare to the very bones, with nothing left to the imagination, but complete in its suggestiveness.

It is not necessary that a picture should tell its story right to the very end—nay, more, it is inartistic to do so. Suggestiveness is the end of a picture, and a work of art will ever leave much to the imagination. Those threadbare worn subjects are insulting even to the imagination of a child.

Beauty of form is secured in the harmonious blending of uniformity and variety. These two qualities must go hand in hand, and beauty can only be perfect where the measure of uniformity does not weaken the charm of variety, and variety has not been permitted to overstep the bounds of modesty to destroy artistic repose.

If photographers are ever to produce by means of the camera great works of art, they must study what propriety will admit of their representing, or in the craving for originality and picturesqueness they will be led into all kinds of absurd eccentricities.

Much that is perfectly legitimate in painting is, it will be readily acknowledged, inadmissable in the photographic picture. Propriety in the conception of a picture, and, perhaps, not less so, in the means adopted to secure a proper and becoming result, must be studied and ever kept before the mind.

The portrait does not seem to present very great temptation to the abuse of these principles, but there is a tendency now-a-days to strange and wonderful flights of fancy, even in the portraits of private persons.

Costumes by all means, if they are becoming and artistic —that is quite a matter of taste, and there is no outrage done to propriety or fitness; but, apart from this, much has of late been attempted beyond the powers of the camera, and antagonistic to art.

Let us take care

"*To hold, as't were, the mirror up to nature.*"

THE EDUCATION OF PHOTOGRAPHERS.

No. 2.

BY GEORGE CECIL HANCE.

Now that the idea has been mooted that the Photographic Society of Great Britain should take the initiative, and become, as it were, the parent of a school for the better education of photographers, I am desirous of supplementing the remarks contained in my previous communication on this subject.

The list of names the Society already possesses contains, as the outside public, as well as the professional world, are aware, some of the most prominent men in connection with photography. Surely they are the best nucleus for the formation of a photographic school, without the infusion of fresh blood into its ranks. But the Society states that they are hampered, in starting a scheme to better educate the junior members of the art, by want of funds. The question then arises, How are these necessary funds to be obtained? I answer, By a general appeal to the profession, and also to amateurs, for subscriptions and donations.

It must be borne in mind that there are at the present time a great number of photographers who are not members of the Society, yet who are, without doubt, strongly interested in the future supply of photographic labour. A direct appeal to these gentlemen and others would be scarcely fruitless, and they would, as your correspondent ("An Old Member") remarks, be much more likely to become members of the Society if they knew that by so doing they were materially assisting in the formation of what ought really to be called a national project. And even if they did not join the Society, but gave a yearly subscription or donation to a school, they would be greatly helping in a matter in which they had large interests.

Now, there are several names in the list published by the Society, whose owners, if they could only be induced to interest themselves, could obtain not only the pecuniary aid of noble and distinguished amateurs, but also enlist the sympathies of Royalty on behalf of a scheme which has for its main object the better education of a section of society in which a vast amount of capital and labour is annually employed, and which is deserving of the mutual support and assistance of the whole nation.

In conclusion, I may say that there ought to be no real difficulty in obtaining monetary help from any who are in the slightest way connected with the art of photography, and that, though the formation of a school might not possibly be of any direct advantage to them in their day, yet, when "the time cometh when no man can work," they would have the pleasing recollection that they had been the means of meeting the wants and requirements of the new and rising generation of photographers.

THE SPONTANEOUS COMBUSTION OF PHOTOGRAPHIC PYROXYLIN.

BY DR. H. VOGEL.*

It has been often maintained by chemists that pyroxylin used by photographers will ignite spontaneously. The assertion rests on the fact that gun-cotton has been proved to be spontaneously combustible, but the error arises from supposing the two substances to be identical.

Notwithstanding their similar constitution, they really differ materially in their chemical properties. Gun-cotton contains considerably more nitrogen (as hyponitric acid) than pyroxylin. Gun-cotton flashes quickly when fired, like gunpowder; pyroxylin, on the other hand, very slowly. The former is insoluble, the latter easily soluble, in alcoholic ether. For the last ten years I have kept in the photographic laboratory of the Royal Gewerbe Academie a great variety of pyroxylin of English, German, and American manufacture. They are stored either in tin canisters, or loosely rolled up in paper. My pupils have repeatedly, in sharply shutting the drawers, rubbed and compressed parcels of this cotton; some of the rolls have been thrown about, because their contents were not at once recognised; canisters full of cotton have often been left for months together exposed to the full heat of the summer sun; in short, all these different kinds of pyroxylin have at various times been placed in what might be thought to be most dangerous situations, but not once have I observed a case of spontaneous ignition. More than this, no such cases ever occurred within the experience of photographers who are continually handling the substance, and are by no means noted for the care with which they do so. It is true that pyroxylin will often decompose in time, but never under circumstances attributable to spontaneous combustion; on the contrary, it is transformed into a brownish, resinous substance, soft and viscid. Supported by these experiences, I assert that pyroxylin is not spontaneously combustible, and I believe that all supposed cases of spontaneous combustion are caused by careless contact with fire. I have already expressed my opinion on this subject in the tenth volume of the *Photographische Mittheilungen*, and more recent experience fully confirms what I then stated.

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* *Photographisches Mittheilungen.*

When pyroxylin is moistened with water, it is no longer combustible, and can be transported without the slightest fear of danger. I myself have in my many journeys, which have extended over thousands of miles, carried pyroxylin in a dry state in my trunk; the trunk has been submitted to all the different kinds of treatment which can possibly occur in railway travelling, and yet I have never met with an accident. In the interest of photographic science it is necessary as well for manufacturers as for photographers to protest against the aimless regulation forbidding the postal transport of pyroxylin, whether in a wet or dry condition; the regulation goes still further, for the cotton may not be sent even in tin canisters. In the face of such injunctions, photography will become impossible in all places where there is no pyroxylin manufacturer.

In Austria, I understand, the same trouble exists. But those who are there interested in this question can point to the fact that the transport of gun-cotton is allowed; they have, therefore, an advantage, for it will not be difficult for them to show that the pyroxylin is a much less dangerous substance. It is true, a petition from the Photographic Society of Vienna, begging that pyroxylin soaked in a solution of carbonate of potash — (why carbonate of potash? — water will do equally well) — might be permitted to be sent by rail, has been met with a refusal; but with that the last word in this question has not been uttered. A most interesting lecture, by Dr. G. Janecik, on the transport of explosive substances by railway (see Mott's *Photographische Notizen*, January number, page 8) affords excellent material, to those who are interested, on which to base a protest against the prejudices of the authorities.

A portion of this lecture we extract for the benefit of our readers. The lecturer, after manipulating with an iron hammer a quantity of pyroxylin on an anvil, and showing that no change takes place, at the same time proving by igniting it that it is really nitrified cotton, proceeded to say: —

"Let us consider the probable consequences of this regulation to which we are submitted. By this means pyroxylin will no longer be an article of commerce, and the vital nerve of an art which can scarcely be overestimated will be severed. Photography will be ruined. You will ask me, probably, 'How is it, then, that, notwithstanding this prohibition, our photographers go on working? Photography does not even appear to suffer?' Now this is the very point we want to arrive at. Through the regulation forbidding the transport of pyroxylin, a result has been obtained the exact opposite of that which was intended. The object was to give greater safety; the effect produced has been to entail more danger. Photographers in the Austrian Empire can carry on their art without hindrance, because pyroxylin can now be smuggled under a false declaration; and this is all the easier because no layman can, from the appearance, distinguish between pyroxylin and ordinary cotton wool. An official of the post, or of the railway, receives a parcel of pyroxylin which is described as cotton wool, and he will have no hesitation in forwarding it, but naturally without taking any precaution, as he is not aware that he has to deal with a dangerous substance. Thus, you see, notwithstanding the rigid prohibition, the substance which they fear and decry can freely circulate. Still, we are not at the end of the question. Permit me to show you a sample piece of paper, and I ask you which of you would have the slightest hesitation in furthering the transport of whole bales of such a substance? And yet this paper is nothing else than pyroxylin, and that in a form in which it is peculiarly adapted for photographic purposes. Now, imagine a parcel of this collodion paper declared at the goods station as common paper; the porter who controls the lading, misled by the false declaration, will scarcely exercise the necessary care in dealing with so inflammable a substance. The very anxiety of the carrier companies to prevent accidents may be the cause of a frightful disaster. But I have said enough on this point to enable you for yourselves, from what you have seen and heard, to draw still more pertinent conclusions. A proposal has been submitted, by way of compromise, to abolish the restriction of transport in the case of pyroxylin which has been reduced to a pulp in water, or in a solution of potash; in this form it is absolutely free from any danger of ignition. Personally, however, I am against accepting this concession, though I know of many photographers who are eager to embrace the proposal. We may some of us be railway officials, but we are also human beings. For example, as a railway official I might require that pyroxylin should not be capable of transport at all, or, at all events, that it should be admitted only under extraordinary measures of precaution. Good, we say; we agree to send it only when made safe by water or potash. Now, what must the receiver of the goods do that he may render them capable of use? In the first case, he must dry his pyroxylin; in the second, he must wash out the potash, and then also dry it. Now, it is this very drying which is one of the most dangerous operations in the manufacture of pyroxylin, as well as in that of gun-cotton; it is this very drying that has been the cause of untold accidents in the laboratories. And this process, which in the manufactory is conducted under the eye of an experienced chemist, we are willing to entrust to the unskilled hand of a layman, who, it is to be feared, even with the best will, does not know how to exercise what is unquestionably a necessary precaution. And then photographers would have to bear the blame of the accidents that would happen!"

It is to be hoped that the manufacturers of Germany will not be behind those of Austria in the zeal with which they take up this question.

WHIMS AND FANCIES OF A LANDSCAPE PHOTOGRAPHER.

BY E. BRIGHTMAN.[*]

LIKE all other photographers, I have my whims and pet theories, and although many of my ideas may be simply fancies, the narration of them will perhaps lead us to a discussion during which some useful remarks may be elicited.

I should state that the whole of my remarks may be taken as applying to landscape work only, as several of my whims as applied to portraiture would need considerable modification. Many of our members, doubtless, anticipate that my whims and fancies will take the form of a recital of certain pet formulæ; this, however, is not my intention, for one of my strongest whims is an utter dislike of anything like a formula. One of the great weaknesses of photographers is a blind adherence to certain formulæ instead of an intelligent appreciation and application of the principles of the photographic art.

The conditions under which a landscape photographer works are so varied that the use of fixed formulæ, instead of tending to success, only leads the photographer into difficulties.

One of the most varying influences under which we work is that of temperature; at one time we may be working in an atmosphere of 90°, and at another with the thermometer at freezing point. What can be more absurd than the idea of using the same formulæ under such widely different conditions? Take, as an example, development under such circumstances, and what would be the result? The developer that with the high temperature would cause the picture to flash out with the rapidity of lightning, would, under the influence of the lower temperature, possibly fail to bring out any of the deep details of the picture. Yet how frequently do we hear that success depends upon using a developer containing just so many grains of iron and so many minims of acetic acid, and that the slightest variation leads to certain failure! *Apropos* of this subject, I may give an anecdote which, though rather an old one, is too good an illustration of my meaning to be omitted.

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[*] Read before the Bristol and West of England Amateur Photographic Association.

A certain photographer, perhaps not one of the most successful, met a brother of the art whose work was always of the highest merit, and universally admired; our successful friend does all in his power to make the acquaintance of the other, and, with note-book in hand, inquires how his toning is done, how his enlargements are made, and carefully notes down all particulars, and asks so many questions as to become somewhat of an annoyance. At last he comes to the all-important question, "How do you mix your developer?" He receives the answer, "With brains." Out comes the note-book again: "Mem.—Developer mixed with brains." "Thank you; and how do you make your bath?" "With brains also." Possessing just sufficient brains to see that he was getting the worst of it, our friend quietly retires. Let us hope that the lesson was not lost upon him, and that he found out that there was something more to be learned in photography than a blind adherence to a formula.

I think I have said sufficient in support of my first whim to show the necessity of varying our formula according to the conditions under which we are working, and that a careful study of the action of the various chemicals, and judicious application of our knowledge, is more to be relied upon than a strict adherence to a mere formula. I will now take in succession the various operations in the taking a negative, and give my whims in connection with each, and attempt to give a good reason in support of each of my fancies.

First, then, let us consider the cleaning of the glass plate. Simple as the operation may seem, it is one which is the groundwork of success, for with a dirty plate it is impossible to succeed. For new plates nothing can be better than the application of a mixture of alcohol and ammonia, rubbed well over with a tuft of clean rag; new glass should require nothing further than this, the chief impurity which we have to remove being simply the result of greasy finger marks. Acid for the purpose is worse than useless, and, instead of removing a grease mark, only makes matters worse, by forming a compound more difficult of removal than the grease itself. Acid is undoubtedly useful for cleaning plates previously used, for if by chance a used plate is put aside uncleaned, it will be found covered with a metallic scum, which adheres to the glass with the greatest tenacity. For the removal of such stains nothing can be better than the use of either nitric or hydrocloric acid, diluted with water. Rouge and tripoli, though useful and effective as plate-cleaners, I object to, for the reason that particles are liable to adhere to the rough edges of the glass, and get carried into the bath. The use of a substratum of albumen has been highly recommended, and, though doubtless efficacious, may carry injurious organic matter into the bath. For my part, I am inclined to look upon albumen as an apology for cleanliness, and a lazy way of getting over the trouble of plate-cleaning. Such expedients are not advisable, and are too much like putting on white gloves to hide dirty fingers, or buttoning up a vest to hide a dirty shirt-front. In order to obtain the best results, new glass should, as far as possible, be used, well cleaned with alcohol and ammonia, and finally polished with a perfectly clean cloth, kept for the purpose only. While on this point, I may say I am particularly whimsical as to the cloth used for this purpose. If we take a cloth or towel white and spotless as it comes from the hand of the laundress, and proceed to polish a plate, we find that each stroke, instead of removing marks and streaks, only adds to the number. We may rub and polish, and polish and rub, till our arms ache, and our plate only becomes worse and worse; in fact, instead of cleaning our plate with a clean cloth, we are using one impregnated with a concentrated essence of soap-suds. For this purpose, I always take a so-called clean cloth, and, for the time being, turn laundress, and thoroughly wash in repeated changes of water, and finally wash out in clean water to which is added an ounce or so of liquid ammonia.

As to collodion, there are now so many good collodions in the market that it may seem out of place to name any maker. I have tried most of the makers of repute, and have only on one occasion had a bad sample. Some makes would seem better adapted to one purpose than another, but for general landscape work nothing can be better than Rouch's D. It flows evenly, gives a smooth textureless film, which bears any amount of washing; it gives a fair amount of intensity without forcing, and for half-tone and detail in the shadows nothing can be better, and when slightly aged will bear a long exposure without fogging, better than most other makes. Its keeping qualities are certainly unsurpassed, and, taken all in all, may be considered for landscape work as one of the best (if not *the* best) collodion in the market. In thus stating my preference for a special make, I would not say one word against others, and, considering the competition and outcry for cheapness, the only wonder is that so many good collodions are to be obtained.

For landscape subjects having heavy masses of foliage or any deep shadows, the addition of a grain or two of bromide of cadmium to each ounce of collodion is advisable, as it reduces the tendency to hardness in the high lights, and gives detail in the shadows, and tends in all cases to give more harmonious and delicate pictures.

In no case is it advisable to use for landscape work a newly-iodized sample of collodion; as a rule, it is better for keeping until it becomes a deep sherry colour, when it will bear a sufficiently prolonged exposure to give all the detail without fogging in the better lit portions of the picture. With a newly-iodized collodion it is almost impossible to expose a picture long enough to get all details, without risking fog in some portion of the plate. We doubtless lose in rapidity by using an old and ripe collodion, but rapidity is a matter of so little importance that we need not take it into consideration; in fact, unless we can work so rapidly as to get absolutely instantaneous pictures, I am decidedly of opinion that it is better to work so as to give very prolonged exposure, and I should prefer an exposure of three or four minutes to three or four seconds. For running water or cascades it is usual to attempt rapid exposures, such subjects, as a rule, being surrounded with heavy foliage or dark masses of rock. A perfectly instantaneous exposure is rarely admissible, and, as a rule, a compromise is made, giving an exposure too long for an instantaneous effect with the water, and too short to give proper detail and half-tone in the deeper parts of the picture; the result is usually a failure. Under such conditions, I consider it preferable to prolong the exposure, so as to obtain all the detail of the deepest shadows; and the running water, instead of suffering, will really be improved by the long exposure, the effect being more like a correct rendering of the subject than a semi-instantaneous exposure can ever give.

At first sight this may appear somewhat strange; yet, if we closely examine a running cascade, we shall find that, although at first sight it may appear ever changing, yet there is a constant and regular succession of the same motions and the same forms, and, as in gazing at a landscape containing such a subject, we do not get an instantaneous impression, but an impression as given by such succession of changes. So I conclude the impression on the plate as given by a long exposure is in effect more natural and lifelike than the effect given by a semi-instantaneous exposure.

As an example, I may instance the picture of a cascade on the East Lynn, which I may say, without being egotistical, is a better rendering of running water than nine out of every ten such subjects. Yet the exposure was in this case, as far as my memory serves me, about forty or fifty minutes, and the result is certainly natural, and gives the impression of life and motion. This picture I have shown to several experienced photographers, and it has more than once been greeted with the remark, "Of course, this is instantaneous?" You may judge the surprise caused by my giving the facts of the case.

Having on a previous occasion given a paper on the negative bath, I should be needlessly taking up your time by any repetition. I may, however, state that I have taken to a fancy in discontinuing the use of distilled water for making the bath, for an examination of the distilled water as supplied by the chemists has convinced me that in many cases it contains a large amount of organic matter, and is, in point of fact, less reliable than water as supplied from the Company's pipes, which I now always use for making my bath. The Company's water, though it contains a considerable amount of chlorides and carbonates, is fairly free from organic matter, and I have succeeded in making a good working bath without any preparation by simply adding the requisite quantity of silver to the water, and filtering.

As a rule, I keep a large glass bottle filled with water standing on a greenhouse shelf in the full sunshine. To the water is added a small quantity of nitrate of silver, which, of course, in the light precipitates the organic matter. I have thus at hand a supply of water for making up a reliable bath at a minute's notice. By acting in this way I think I could make a good working bath from ditch water.

We now come to a consideration of the developing solution. For this I prefer the double sulphate of iron and ammonia to the ordinary proto-sulphate, the resulting picture being richer and warmer in tone than when the latter salt is used. The reason of this is that the ammonia sulphate of iron is a more nearly neutral salt than the ordinary protosulphate, which contains a considerable quantity of free sulphuric acid—sulphuric acid having a tendency to produce cold grey images, as may be readily proved by preparing a developer, and adding sulphuric acid instead of the acetic acid as usually added.

In practice I prepare my developer by making a strong solution of iron, and adding the required quantity of acetic acid, keeping in this state, and diluting as required for use: by so doing I find I get better results and richer and warmer tones than by making the developer of the required strength, and afterwards adding the acid. I am inclined to think that when the acid is added to the dilute solution the result does not appear to be the same. On adding acetic acid to a saturated solution of the iron, small crystals are precipitated. I am not sufficiently versed in chemistry to understand the composition of these crystals, but presume them to be a modified form of acetate of iron, and it is to the substance so formed that I am inclined to ascribe the good results of a developer prepared in this manner.

It will probably be suggested that the addition of acetate of iron will produce the same results; but having tried developers containing acetate of iron formed by double decomposition with acetate of lead and also acetate of soda, I find they do not give the same results, being usually accompanied with a trace of fog and deposit in the shadows, whereas clearness in the shadows is one of the great point in a developer prepared as I have described. Having during our last session giving a paper on iron intensification, it will be unnecessary for me to say anything further on this point, but I may add that the past season has more than ever convinced me of the value of iron intensification.

With these few hastily-put-together notes, I must close my paper, which I trust may lead to a conversation more profitable than my few remarks, my regret being that I am not able to offer something more worthy of your consideration; but want of time prevents my devoting so much attention to the study of our art as I could desire. I am, therefore, obliged to play the part of a butterfly photographer, passing from flower to flower, and sipping the pleasures of our beautiful art-science, instead of diving more deeply into its yet untold wonders and untrodden paths. Such a course leads but to whims and fancies, where

"Errors like straws upon the surface flow;
He who would search for pearls must dive below."

THE NEW IRON DEVELOPER FOR DRY PLATES.

Captain Abney, in the Society's Journal, says:—

"We have recently been trying the new iron developer recommended by Mr. W. Willis, Jun., first announced by Mr. Carey Lea—we mean the ferrous oxalate developer. It works admirably, but is very apt to return to the ferric state by oxidation.

"Ferrous oxalate is formed by adding oxalic acid to a ferrous sulphate solution. When the precipitate is well settled, the supernatant liquid should be decanted off and well washed. This is best done by throwing it on a piece of calico, and pouring two or three beakers of water over it. A saturated solution of the neutral oxalate of iron is next prepared, and the ferrous oxalate thrown into it. When a slight residue of the latter is left, the liquid should be decanted off and kept in stoppered bottles.

"To use this developer with dry plates, we have found it preferable to use a slight restrainer. One grain of potassium bromide to each ounce of the solution prepared as above is sufficient. The developer is applied in the ordinary way, and the image appears gradually, and develops out to full intensity.

"The *ferrous* citrate of iron and ammonia is also effective. Presumably those salts of iron which are not precipitated by the addition of ammonia, such as the tartrate, could be used. It is noteworthy that the ferrous oxalate solution is alkaline, and, in our experience, when neutral, it is much less active.

Correspondence.

FADING OF PIGMENT PRINTS.

Dear Sir,—In your leader of March 15th. *re* "Permanency in Pigment Prints," you state that you have been furnished by Dr. Monckhoven with some examples of prints in Autotype tissues prepared with alizarine, and that upon exposure to light under a mask, those portions to which the light has had access have "somewhat changed colour," whilst the similarly exposed portions of Dr. Monckhoven's remain unchanged. With your characteristic fairness you point out that there is no evidence as to how the Autotype tissue is prepared, or whether it was prepared by Dr. Monckhoven himself from an assumed Autotype formula. Now we think that this information is absolutely necessary' and of most vital importance in the consideration of the question.

We have ourselves received from Dr. Monckhoven a specimen of what is *said to be* our own tissue, dated December 1877, and which has been exposed to light under a mask, and exhibits some change of colour. Now if the print sent to you, Mr. Editor, and the print forwarded to us be in the same tissue, we are absolutely certain that it is *not* alizarine tissue at all, but simply a cochineal tissue; and as we have on every occasion pointed out that tissue made with cochineal does change by prolonged exposure to sunlight, we do not see that any new fact is elucidated by this comparative trial. Cochineal gives a fine colour, and has been employed more or less sparingly by tissue makers for years; it is true that it does fade somewhat, but the result is the toning down of the prominent tint to a cooler (and to many a more agreeable) shade without the slightest sacrifice of the half-tones of the picture. The safety of the picture is in its carbon base, and Dr. Monckhoven's predication of fading in all carbon prints is a wide assumption against which the whole balance of evidence will be found arrayed.

Interested as we are in carbon printing, we must welcome with satisfaction any contribution of experience or scientific theory which either facilitates the practical working of the process, or gives fresh guarantees of permanency; but it is prudent to restrain opinion within the limits of ascertained facts.

We beg to forward with this letter a specimen of our alizarine tissue, which we think is permanent, and place at your disposal to test in any way that may suggest itself to you; but we must deprecate the publication of trials likely to throw discredit on our manufactures without the data and the information being afforded that will alone enable us to judge if the experiment has been fairly carried out, and to rectify errors if they have been made.

As we make pigmented tissues to the formulæ of our clients, many of whom believe that prints enriched with carmine tints and treated as works of art are practically permanent, Autotype tissues only gauranteed as such are open to criticism; and we will just add, that *every* band of tissue sent out by us bears the name and number of the tissue, with the date upon which it was made.—We are yours, &c., THE AUTOTYPE COMPANY.

[Some fine prints of a tint indistinguishable from that of a fine gold toned silver print reach us with this letter. We shall submit them to sunlight, partially masked, as proposed. A test like this, with the concurrence of the producers, will be fair and trustworthy.—ED.]

THE ACTION OF LIGHT ON BICHROMATED GELATINE.

A LETTER FROM DORNACH.

DEAR MR. EDITOR,—Referring to your Editorial of March the 15th, on "Permanency in Pigment Prints," I enclose you herewith (1) a bichromated gelatine film, such as used in the establishment of Messrs. Braun and Co., in the Woodbury Process; and (2) a pellicle which has been exposed under a negative, and washed over night. The latter possesses a faint greenish colour, while the first is of a beautiful lemon tint, and I expect it will arrive in its original colour, though not wrapped up in yellow paper.

No. 1, on being exposed to light, will soon exchange its colour for a bronze brown, as can be readily proved, while No. 2 will retain its green tint, which is evidently due to oxide of chromium, no matter how long it may be solarised; but No. 1, if brought in contact with a sufficiently large quantity of water, will slowly lose its brown appearance, and become green as No. 2.

Now what does this mean? In your esteemed journal of the 21st December, 1877, in an article translated from that live and well posted up *Photographische Wochenblatt*, headed "The Chemistry of Carbon Printing," it was pointed out by the late M. Braun that the bronze colour was probably due to the formation of a "chromate of sesquioxide of chromium" ($Cr_2\,O_3,\ 3Cr\,O_3$)[*] which, in contact with ammonia, yielded chromate of ammonium *plus* oxide of chromium. He forgot to state that water, like alkalies, decomposed this salt also.

From your very instructive Editorial I learn that you expressed the same opinion upwards of ten years ago; but while I agree with you that it has not since been shown to be erroneous, I fail to see that it has been proved to be right in every respect, and unassailable. What the writer of this communication would wish, is to have these actions and reactions explained by chemical formulæ, which, he must confess, he has not been able as yet to do to his full satisfaction.

Here I present you an equation, which you will accept as simply theoretical:—

$$\overset{\text{Bichromate of potash.}}{2\,(K_2\,CrO_4,\ CrO_3)}$$

in contact with organic matter, such as gelatine, and under the action of light, is changed into:—

$$\left.\begin{matrix}Cr_2\,O_3\\ KO\\ KO\end{matrix}\right\}\qquad \underbrace{CrO_3 + K_2CrO_4 + 2O}_{\text{Yellow chromate of potash.}}$$

Now arrives the question, what becomes of the two equivalents of oxygen? Are they absorbed by the gelatine, or are they lost? Again, in what manner does the water act by washing? Is CrO_3 oxydized in any way, or does it leave with 2KO?

Certainly, these questions are only to be decided by renewed experiments; but it seems to the writer that the co-existence of another yellow, in water insoluble, chromic salt in the washed tissue and gelatine film, as suggested by Dr. Van Monckhoven, is not so improbable as it seemed to be at first sight. However, we should like to learn some of the properties of this salt, its chemical composition and crystalline form, its behaviour to light, &c. On these points we hope to be enlightened in the promised paper of the distinguished Belgian *savant*.—In the meantime I am, yours very truly, DR. ADOLF OTT,
With Messrs. Braun and Co., in Dornach.

[The enclosures in our correspondent's letter confirm the view we expressed. One is a gelatine film of the pale green tint of sesqui-oxide of chromium, which has not changed by exposure to sunlight. The yellow bichromated pellicle was exposed, and changed to a yellow brown; washed for a few hours it became green. The question of what becomes of the oxygen has not yet, we think, been shown. The notion, held by some, that the gelatine is oxydized, and so rendered insoluble, is clearly not tenable, as the solubility of the insoluble film is restored by the use of an oxydizing agent. Mr. Swan, in the course of his early experiments, thought the oxygen went to form carbonic acid.—ED.]

NATURE OF LIGHT.

DEAR SIR,—I have no reason to complain of Mr. Reynolds defence, inasmuch as the arguments he has advanced in support of the points he defends are forcible illustrations of the correctness of the remarks I had published on the phenomena of sight. I care not to prolong controversy on so unimportant a matter as whether light consists of a combination of this or that colour, for I have ever found my best ally in *time*. I cannot blame Mr. Reynolds for sticking to popular authorities, because it is a safe practice to believe in what the world swears by, as contradictions in such cases must emanate from some isolated individual like myself, whose ill fortune it is to have opinions of his own, and the courage to express them, well knowing that the short cut to popularity consists of bowing down to such idols as the world loves to worship.—Yours truly,

W. T. BOVEY.

2, St. Ann's Villas, Avenue Road, Acton, W.

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Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—This Society will meet on Tuesday next, April 2nd, at 5A, Pall Mall East, when the discussion on Dr. Monckhoven's paper (read at the last meeting) will be resumed; and Mr. England will read a paper entitled "Dry-plate Photography: A few Remarks on the various Processes, from Practical Experience, with Copies from Negatives taken by the different Methods."

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[*] Chromate of potash (*vide* 13th line from below) is evidently a misprint, as may easily be seen by comparing the German original.

South London Photographic Society.—At the next meeting of this Society, on Thursday, April 4th, in the rooms of the Society of Arts, Adelphi, Mr. Foxlee will read a paper, "Hints on the Gelatino-Bromide Process."

Photography at the Next Arctic Expedition.—The next Arctic expedition will be sent by a nation once famous on the seas, the countrymen of Admiral Von Tromp. In May a sailing vessel, a schooner of something over eighty tons, will sail for the Arctic Seas, thoroughly fitted for scientific exploration. Our friend and correspondent, Mr. W. J. A. Grant, who accompanied Captain Sir Allen Young in the *Pandora* as photographer, will join the Dutch expedition in the same capacity. The *William Barens* will carry a geologist, medical man, and photographer, three officers, and eight able seamen. The second officer is Lieutenant Beynen, who went out with the *Pandora*. With the exception of this gentleman and Mr. Grant, none of the others have any experience in Arctic exploration. The schooner will sail in May, and will proceed to the north of Spitzbergen, and thence round by Nova-Zembla. The expedition is fitted out by the general subscription of the Dutch people, and is not the result of a Government subsidy.

Photography and the Printing Press.—A very interesting course of lectures has just been completed at the Society of Arts by Mr. Thomas Bolas, F.C.S., "On the Application of Photography to the Production of Printing Surfaces and Pictures in Pigment." Mr. Bolas is a facile and interesting lecturer, and master of his subject, in which he thoroughly interested his audience. We hope shortly to give some details of his lectures.

Simple Autographic Process.—Mr. A. Pumphrey, in the *English Mechanic*, describes a simple autographic process. He says:—"May I draw the attention of those interested in such processes to a new one, which is free from any of the difficulties mentioned? The original writing is made on ordinary paper in a simple ink; ordinary gall ink will answer if to be copied as soon as written. A film of gelatine is prepared, supported on slate or other suitable material; this is moistened by an exciting fluid, and all surface moisture removed. The writing is brought in contact with the gelatine surface, passing it through a pair of rolls, the paper is removed, and the plate is found to be impressed with the writing. It is at once ready to be inked with a suitable ink, which will only adhere where the ink has touched. The results are very perfect, and with care much more perfect copies can be produced from stone or zinc, as the gelatine is capable of more gradations than either."

Various Copying Processes. — The *Scientific American* gives in brief a series of copying processes useful for producing leaf prints. It says:—"Pass the paper first through a solution of gelatine, one part in twenty parts of hot water, and use a strong solution of potassium bichromate; or the gelatine and bichromate may be used together. Wash with hot water. A strong blue background may be produced as follows:—Dissolve in two ounces of pure water 120 grains of red prussiate of potash (potassium ferrocyanide), and separately 140 grains double citrate of iron and ammonium in two ounces of water; mix the solutions, filter, float the paper for a few minutes on the filtrate; print from the dried paper as before, and wash thoroughly in water. By adding a little phosphoric acid to the bichromate solution, and exposing the print before washing to the vapour of a hot solution of aniline in alcohol, a blackish-green or red positive is obtained. Or prepare the paper with solution of iron sesqui-chloride, and develop after exposure with a very dilute solution of silver nitrate. Use plain photographic paper."

To Correspondents.

J. H. K.—The reason why a north aspect is recommended for a portrait studio is simply because from that aspect the most uniform light is obtained. It is free all day long from direct sunlight, which east, west, or south is not; and in this country the northern sky is, as a rule, most free from clouds.

C. C. O.—There is no need for a copyright photograph to be marked "registered," simply because the Copyright Act does not require it. But the justice and propriety of the case are apparent enough. You ask how you are to know that a picture is copyright if it be not so marked? It is not necessary that you should know anything about it. You know that the copyright is not yours, and as the probability is that it is somebody's, you cannot have any possible right in it, nor any claim to copy it for your own purposes. If in walking in a lane you see a horse strolling along unattended, you would not dream of appropriating it because no owner was apparent. So in regard to a picture, ownership should be assumed. At any rate, the law has arranged that anyone copying a picture does so at his own risk, as the owner of the copyright is not enjoined to indicate that the picture is registered. 2. We shall have pleasure in giving you aid in any special point of the collodion transfer process if you will specify the special information you desire. Full instructions in working the process have repeatedly been given in the News and Year-Books, but would require too much space to be given in "Answers to Correspondents."

B. L. K.—You need be under no apprehension. There is no allegation that carbon prints fade in the same sense as silver prints. The latter sometimes disappear altogether, or they become very faint and very ugly. But the alleged change in carbon prints is, that the organic colours added to give a rosy warmth to the black of carbon will become fainter or disappear. This has been admitted as regards some organic colours, such as carmine. It is known to be a fugitive colour, and will change after exposure. But alizarine is regarded as a permanent tint, and the allegation is that it also will fade under the action of light when in the presence of certain chromic compounds. This is the point just now at issue. It is one which practical carbon printers cannot fail to feel interest in; but not one to cause them serious concern, as there are various permanent pigments available. We have at the present moment several testing experiments in progress, which we shall report in due time.

M. (Nottingham).—There have been from the first introduction of photography various nostrums proposed for securing excessive rapidity. So far as we know, the various proposed empirical additions to the collodion have been worthless. Collodion containing iodide of cadmium and ammonium and bromide of cadmium, about two grains of each, used as early after mixing as convenient (say in a fortnight), excited in a neutral bath, developed with a fifty-grain iron solution, containing also about ten minims of acetic acid, will give as rapid results as any formulæ we know. Heating the developer is an aid to rapidity, but it involves risk of fog. But for instantaneous pictures you must have a rapid lens and good light.

B. R. N.—When once a vessel has been used for hyposulphite solutions it is better to keep it for that purpose, and nothing else. The stains at the back of your prints are doubtless due to hypo. You have used, you say, the dish in which you had kept hypo. fixing solution for rinsing the prints prior to toning. Just so. That dish retained traces of hypo. in spite of your careful washing, and, coming into contact with the free nitrate of silver on the prints, at once caused a stain. It is better to destroy a hypo. dish than to use it for any other purpose in photography.

W. Quin.—It is difficult to say which is the best method of printing on wood for the purposes of the engraver. Probably none is so suitable for the engraver as an image in fatty ink from a photo-lithographic transfer. But this is a troublesome method to those not familiar with the work. A pretty good result may be obtained by the collodio-chloride of silver process, using a very powdery collodion. The cyanotype process has been recommended, and will probably answer pretty well.

W. E. Swift.—The small yellowish-white spots are caused by particles of bronze powder used in producing the gilt border on the card, and probably in the printing on the back.

Lights and Shadows.—Preparation of photographs for colouring depends on the mode of colouring. If for colouring in oil, they are sized with a solution of isinglass in dilute alcohol, or in gin. If for water-colours, various preparations have been recommended. A very dilute preparation of the size mentioned above may be used; a solution of ox-gall may be used; or a dilute solution of shellac in a saturated solution of borax. We cannot give you precise proportions, because, although we have tried and mixed all these, we have used our judgment as to the thickness of the preparation, or, frequently, tried it. 2. We will repeat the instructions for printing on silk in our next, or shortly. 3. The microscopic photographs you mention are produced in Paris. Whether or not they can be obtained in this country, we cannot say. 4. The Copyright Act prohibits copying without permission, for any purpose whatever.

Old Daguerreotype.—In our next.

Several Correspondents in our next.

The Photographic News, April 5, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Safety and Dangers of Pyroxyline—Two Practical Receipts—Why Some Carbon Prints Turn Yellow.

The Safety and Dangers of Pyroxyline.—In Germany and in Austria they have recently been discussing the qualities of photographic pyroxyline, or soluble gun-cotton, and in our last week's impression we printed an able paper by Professor Hermann Vogel on the subject. They are very strict about the carriage of pyroxyline in Germany, it appears, and they make no distinction between photographer's gun-cotton and military gun-cotton. This arises from the fact, Dr. Vogel seems to think, that people imagine the pyroxyline used by photographers will ignite spontaneously; gun-cotton—by which we suppose he means military cotton—"has been proved to be spontaneously combustable," Dr. Vogel says, and the error arises from supposing the two substances to be identical. Military cotton is insoluble, while photographic gun-cotton is soluble in an alcoholic-ether solution. Dr. Vogel further says that their explosive qualities are very different, the photographic material being, he would have us believe, a really innocent material that has been unjustly maligned because of its likeness to its good-for-nothing brother. There is a very great deal that we can endorse in Dr. Vogel's remarks, and no doubt the regulations are unnecessarily strict in regard to the carriage and transport of the photographer's material; especially when in a wet state, it is not only inexplosive, but altogether uninflammable. In fact, as we heard a chemist once remark, you might put out a fire with wet gun-cotton. But if photographer's cotton is not liable to spontaneous ignition, neither is military cotton, the tri-nitro-cellulose, as chemists call it. This cotton, as Dr. Vogel rightly says, is insoluble (in fact, if more than twelve per cent. of soluble matter were removed on shaking it up with alcohol and ether, the material would be rejected as unfit for military purposes), but it is not liable to spontaneous combustion any more than photographer's cotton. It will decompose spontaneously, giving off the red fumes with which all photographers are well acquainted, and subside into a syrupy mass; but it will not explode spontaneously, so far as we know at present. The two pyroxylines, though dissimilar in many respects, are alike in this, and though one burns more feebly than the other, they both explode with terrible violence under certain conditions. In the open air a matted mass of either material would only flare up with more or less vigour, but enclosed in strong canisters, they would both of them explode with extreme violence. For this reason we say it is well not to have overweening confidence in photographic pyroxyline; burnt in small quantities in the open air it is harmless; but confined, it is far more destructive in its violence than gunpowder. Photographers must remember, when they read Dr. Vogel's article, that it is a chemist who is speaking, and that he supposes himself to be addressing those who understand something of chemistry and chemical risk. When one has to do with explosives, however, no matter how gentle and good-looking they may appear, it is well always to remember that they are explosives. Gunpowder we all have a wholesome dread of, for we have learnt by experience to mistrust it under all circumstances, and yet the old-fashioned "villainous saltpetre" is honest and straightforward compared to many of its start-up relations. There is not a year passes now-a-days without some new and wonderfully safe explosive is discovered; all sorts of experiments are made to prove how difficult it is to explode under ordinary circumstances; a blow on the anvil, a thrust with a red hot poker, or other radical means fail to bring about any result. But the chances are that we wake up one morning to find a short telegram in the papers about a terrible explosion at some new factory or other, where the new-fangled compound was in preparation. We say, therefore, that safe as pyroxyline may be under ordinary circumstances, photographers should never forget that it is quite capable of doing us an injury when it gets the opportunity. Fortunately for ourselves, there is, as a rule, little need for keeping the dry material in any quantity. A couple of ounces, in a dry state, is usually as much as any one should have at a time, except when he is about to make a very large batch of collodion; and kept in water, as Dr. Vogel says, the risk is at once reduced to a minimum. In fact, it would be straining a point altogether to say that there would be any danger at all under such conditions. Military gun-cotton, simply put into a net and thrown overboard will explode if there happens to be a premier and detonating charge in contact with it, but it is very possible that photographers' pyroxyline in water would not do so under the same conditions.

Two Practical Receipts.—Two practical papers have appeared in the *Journal pour Chemie*, that contained information that may be useful to our readers, and especially in the case of those who have much copying to do with the camera. The author is Herr E. von Bibra, and the papers relate to the restoration of faded manuscripts and old oil paintings. In some cases the ink is not very old when it begins to grow yellow and faint, and this baffles any photographer who desires to produce a transparent image of the writing on his collodion plate, in order to turn the same into a photo-lithographic transfer, if need be. Herr von Bibra applied freshly prepared sulphide of ammonium to the indistinct passage, and in a few moments the writing begins to come out clearly. The excess of sulphide is got rid of by rinsing with cold water (the use of the wash-bottle is recommended), and the MS. then carefully dried either by gentle heat or between blotting paper. It does not matter whether the material on which the writing appears is parchment or paper. The blacking does not last very long, but if it fades again, a solution of tannin applied in the same way will bring it out clearly once more. As it is only in the very earliest times that charcoal and Indian ink were employed in MS. (and when this was done the writing is not likely to have faded), Herr von Bibra's receipt is likely to be of very general use, since gall-ink is of a very ancient character. The other matter to which we refer is the cleaning of old oil-paintings so that colour contrasts may be rendered more visible. The picture is freed from dust with a feather, and washed with a sponge and water. A layer of soap is then applied (the author suggests shaving soap), which is allowed to remain on for eight or ten minutes, after which the soap is washed off with a brush, and the picture left to dry. A small piece of linen cloth is then saturated with nitro-benzine, and with this the picture is cleaned. All dirt is in this way removed, and the picture stands out bold and distinct. In the end, olive oil may be applied, and subsequently a quickly drying varnish.

Why Some Carbon Prints Turn Yellow.—Whatever may be said as to the merits of Dr. Van Monckhoven's paper on the subject of the bichromate salts employed in carbon printing, it is certain that he deserves the thanks of photographers for the manner in which he has attacked the difficult subject. It is one of which, unfortunately, we know very little, and although we have in our experience seen no instances of faded carbon prints, it is quite certain that we have much to learn in respect to the changes the pigmented film undergoes through light and air. One great evil which exists in many carbon impressions is no doubt due in great measure to careless manipulation and imperfect washing—the presence, namely, of bichromate, which might have been removed by the further sojourn in water of the image before fixing; but yellowness in the skies does not always proceed from this cause. It is due also to the transfer paper changing colour, and becoming yellow of itself. Let those who doubt this look at a sheet of transfer paper that has been lying in their studio for a twelvemonth exposed to the air. They will frequently find the whole surface is of a pronounced yellow, and if employed for transfer, the carbon impression would have all the appearance of a silver print fading away. It is worth while, then, bearing this contingency in mind, when discussing the probability of carbon prints fading, so that if any defective examples are brought forward, the saddle may be put upon the right horse.

A DEMONSTRATION OF THE PREPARATION AND DEVELOPMENT OF PALMER FILMS.

BY REV. H. J. PALMER, M.A.*

The recent publication of a new film process of exceeding simplicity, and one which may be readily accomplished in all its operations by every amateur who pleases to make the attempt, has elicited so much notice in many directions that I have ventured once more to trespass upon your time and patience, in the hope that I may augment the interest of our meeting to-night by enabling you to witness all the details of this process from beginning to end, and also that I may convey additional information to the many who are seeking it on this subject.

My first proceeding is to take a clean glass of quarter-plate size, and, having placed it upon a level surface, I pour upon it three drachms of a thirty-grain solution of gelatine in dilute ox-gall. I distribute the pool from the centre to the edges of the plate, with the help of the tip of the forefinger, which answers better for the purpose than a glass rod, and then remove possible bubbles with the point of a penknife. For this preliminary film, as well as for the emulsion itself, I find that Nelson's opaque is better adapted than the clear photographic gelatine. The latter does not leave the glass so readily, and the opacity of the former effectually prevents blurring, and, at the same time, does not affect materially the printing capacity of the negative.

The remarks on the subject of halation made at the last meeting of the Edinburgh Photographic Society had reference, I imagine, to gelatine negatives on glass, and not to these film pictures. I have never met with the slightest tendency to blurring in my films, and the entire absence of it when opaque gelatine is employed enables me to give up the plan I had first adopted, namely, of backing up each film with a glass coated with coloured gelatine and sugar. In the film negative of the "Interior of Wallasey Church" the large east window is as clear and sharp in all its detail as would be the case with a wet plate. I have exposed dry plates of all kinds upon this subject, and, in spite of a backing of colour, blurring invariably takes place at this point in the picture.

We now sensitize our dried film by pouring upon it a pool of emulsion, and distribute the latter over the surface with the tip of a *clean* finger. To avoid waste of emulsion this operation is better conducted upon a dish or tray, and any spilt gelatine may be restored to the vessel of emulsion for further use. It is important that the proportion of gelatine per ounce be the same in both the preliminary and the sensitive coating. If this be not the case, the film will curl and give trouble under the developer. Some gelatines which I have been using lately manifest a tendency persistently repellent of the emulsion. When this is the case it is better to add a few drops of ox-gall to the latter. It will now flow better over the surface, but will still require to be humoured a little by tilting the glass toward each side in succession, so that the surplus emulsion may run round the edges of the plate two or three times.

When thoroughly dry, the film is readily stripped from the glass, and may be exposed in the camera. The best method of securing a sufficient "taut" surface in the dark slide is, in the first instance, to make the sheet slightly longer than the required size. It is then laid face down upon a sheet of blotting-paper; a glass is pressed into close contact with it, the two ends are moistened with the tongue, folded over, and so fastened to the back of the glass support. In changing the film, a knife readily effects the separation, and the glass is ready for a fresh sheet.

Mr. Kirkby has suggested that these films should be prepared upon ferrotype plates of the larger size, so that a perfectly rigid support may be provided for use in the dark slide. I have tried this plan, and find that the plate will take the gelatine as readily as glass. It will be necessary to secure perfect flatness of the plate during the coating, and the film will strip off for development and printing with perfect ease.

Of the requisite exposure I need say little. It will suffice to mention that the films I am about to develop were exposed in bright sun at 8.30 a.m. yesterday, with Dallmeyer's rapid rectilinear, stop No. 2, for twenty seconds. I place the film in a dish of water for a few moments, pour this off, flow over a ten-grain solution of bromide of potassium, and then follow with the ordinary alkaline developer. When detail is fully out, if necessary, I apply an acid silver intensifier, and then fix with hypo., washing copiously before and after each operation. The negative is conveniently kept from slipping into the sink by the assistance of a camel's-hair brush, and the latter useful little accessory helps me to draw the finished film on to a glass plate, and also to sweep out any air-bubbles which may have interposed between the surfaces.

The films must be allowed to dry spontaneously, or inevitable cockling or splitting will be the result. When desiccation is complete, a knife is inserted under one corner, and then swept rapidly beneath the edge of the film. A pause in this operation will sometimes cause a sudden crack across the negative, as will also the temperature of a hot room. It is essential that no attempt be made to remove the negative from the glass upon which it has dried, until all tackiness of surface has disappeared. If this be neglected, the resulting negative will be useless until it has been wetted and redried, like the specimen I have here.

One word of caution is necessary with regard to density. What would be considered a decidedly weak negative in any other dry process, will be found to possess sufficient printing vigour in the case of a gelatine film.

DIAPOSITIVES.

Suitable for Enlargement or Lantern Slides.

BY A. BRAUN AND CO.*

Preparation of the Paper.—For this we make use of a solution of from three to five parts of bichromate of potash in seventy-five parts of water, and twenty of alcohol; the bath is cooled to a temperature of from twelve to fifteen degrees Centigrade (54° to 59° Fahr.), and filtered into a flat dish. The paper is then plunged into the bath until it softens, which generally takes from one and a half to three minutes. The two surfaces of the paper are then passed over a glass rod placed over the dish, so as to get rid of the excess of liquid that might be adhering to them. The paper is hung up in a well aired room, the temperature of which should never exceed 22° Centigrade (72° Fahr.) In these conditions the paper should dry in six or eight hours; a slower drying would be injurious.

It is important that the sensitizing bath should be made with perfectly pure bichromate, as the traces of foreign matters which are generally found in the commercial article act very injuriously on carbon paper.

Exposure to Light.—The clichés should first be bordered with strips of opaque paper, so as to prevent hereafter the detaching of the impressioned film. This being done, the cliché may be placed in the pressure frame, the sensitized paper on top, and care being taken that it covers the opaque edges of the cliché, and that its adherence to this last should be perfect.

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* Read before the Liverpool Amateur Photographic Association.

* *Photographic Times.*

After sufficient exposure the image is to be developed, care being taken to note the last number of our photometer (a strip of sensitized nitrate paper is used). To cause it to adhere, the two ends of the india-rubber strip are wet with a little benzine. This observation will serve to control the time of exposure of the ulterior operation.

Carbon paper is four or five times more sensitive than ordinary albumen paper, and when development is made upon a rigid support, care must be taken to print in the shade.

Transfer to the Plate and Development.—The glass plate must be thoroughly cleaned. The exposed paper is plunged in water as cool as possible, and allowed to remain until it softens; it is then placed on the plate, which has been previously wet, and the squeegee is passed over the back of the paper. Sized paper should remain from five to fifteen minutes.

Development is made in water of from 30° to 36° Centigrade (86° to 97° Fah.), and preferably in a porcelain dish, where the washing can be better controlled. As soon as the sensitized gelatine commences to dissolve, the paper may be detached from its support; the impressioned image remains on the plate, which should be kept in motion until the washing is complete. It may be remarked that when carbon prints are wet they easily fray, and cannot be manipulated in the same way as those made on albumen paper. The print, when well washed, should be placed for a few moments in cold water, and dried at an ordinary temperature.

To obtain a cliché the diapositive is reproduced in the camera by the ordinary collodion process. If it is desired to obtain a carbon print (by a simple transfer), the pigmented film is placed towards the lens. If, on the contrary, a cliché is required for making an ordinary silver print, the film should be turned outside.

It is evident that by the process described above, it is possible to make from a diapositive a carbon negative by contact. For further details concerning the permanent process, we refer the reader to our pamphlet.

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TINTING CARBON PRINTS.

BY SIR T. G. A. PARKYNS.

[Visitors to the late Photographic Exhibition will remember some tinted photographs being on the back of a screen nearly facing the door, in a position where, unfortunately, they received too little light to permit of careful examination. They would be seen, however, to be agreeably tinted, suggesting prints on tinted paper, instead of presenting the ordinary black and white. The specimens were by Sir Thomas Parkyns, and the specification of his process is now before the public. The tinting is effected by coloured collodion, as will be seen in the following specification.]

My invention is an addition or improvement to the autotype and chromotype processes. It consists in the fact of my being enabled to colour prints so as to produce a pleasing relief as to tint from the ordinary monotone, or white and black, or one shade of colour. I therefore designate it "bichrome."

I adopt the autotype system exactly, with modifications or additions, and for this purpose I use a coloured medium. These mediums are various, but some of them are difficult to manipulate, and none of them so good, practically, as collodion, seeing that they must be applied with water, which requires a considerable time to dry, and is more difficult to manage, whereas collodion flows regularly on the plate, and dries immediately. I treat therefore of collodion only, reserving the right as to other mediums which might be applied to the principle of my invention.

I prefer to use no fugitive dyes or any colours which are likely to fade or change; nevertheless, it is at the option of anyone working under this patent to use any means of colours, or kinds of colours, he may choose, but he cannot in such case guarantee his productions to be permanent unless his dyes or pigments be so accredited by the profession.

I use no colours except dry pigments. These are principally earths or pigments known from long experience to be absolutely permanent, such as the madders, but I can use any colours. These colours I mix in various proportions, and thoroughly grind and levigate them in a mortar, adding more or less of the various colours until the desired shade or tint is obtained.

When the proposed colour is arrived at, or supposed to be, I add a very small quantity to a very small quantity of collodion (as described hereafter), and having allowed it to thoroughly dry on white paper, it (after having been well shaken) gives the permanent colour of the medium. The pigments not being all of the same weight, I use a small measure, about as large as a small thimble, to which a handle has been attached, and of a size suitable for the necks of my pigment bottles. With this I take so many parts of one colour, and so many parts of others, carefully registering the various proportions, so that there may be no uncertainty afterwards. I find that about half a measure is sufficient to colour one ounce of plain collodion, because the tint should generally be arrived at by the mixing of the pigments to the proper shade, and not by adding pigment to the collodion. If too much pigment be added the result will be that in the final operation the transfer paper will not have the power to "pick up" the first collodion, the result being unsatisfactory. Neither must the collodion be of a horny nature, or made with too much pyroxyline.

For the collodion (normal), I take about one hundred grains of medium pyroxyline (which must not be powdery, nor too tough), and having put it into a bottle I add ten ounces of the strongest ether (methylated will do). I then add five ounces of the strongest methylated alcohol. This nearly dissolves the pyroxyline. I then either add a portion of another five ounces of alcohol to the pigment in the mortar, and grind it again for a minute or so, and pour it into the collodion (washing out the mortar with the remainder of the alcohol), or I put the whole of the alcohol into the collodion, and add the pigment in powder. In either case the whole must be thoroughly well shaken, when it may be immediately used.

The above is the formula, which may be increased or diminished to any extent.

The measure for the pigments which I use is about five-eighths of an inch deep, and half an inch in diameter; three or four of which I find about sufficient for six ounces of the collodion.

I now proceed to describe the way in which I utilize my invention:—So far as the autotype procedure goes I follow it up to the point when the tissue-developed picture has been fixed with the alum water, washed, and allowed to dry. This may be gradually hastened. The preliminary wax had better not be rubbed off too much so long as it is smooth. The alum-fixed picture, having been washed and dried, is flowed with the coloured collodion, as above described, and having been allowed fairly to set (which takes a very short time), the plate is plunged into cold water, where I leave it for a few minutes. Meantime the transfer paper (white) is prepared, and when ready the treatment proceeds as usual. It is preferable to allow the picture to dry spontaneously in a warm room, and it should be put under a moderately heavy pressure, as usual, previous to drying. The proceedings are, in fact, precisely similar to the autotype double transfer processes, with the exception of the flowing the alum-fixed picture with the coloured medium previous to transfer.

I proceed to add some ideas which have arisen in the course of my experiments:—As above stated, there are other mediums which may be used in the processes, but they are aqueous, and as such I do not recommend them; for instance, albumen, gum, gelatine, &c. They take long to dry, and the after washing removes part of the colour, the consequence being that they dry very unevenly. They do not properly hold pigments in the same manner that the cotton in collodion does, and I therefore prefer the latter for the purpose required.

I have found that dyes cannot be depended upon, as they change colour in the process of washing to a great extent. According to my process the dry colour thoroughly amalgamated with the film of the pyroxyline is held by it, so that it can be put into water, and kept there for any reasonable time, without any change of tint. If, therefore, ordinary care be taken in the original preparation, there ought to be no variation in the final results. I do not doubt but that those using the patent may find it capable of considerable modification as regards the variation of colours in the same picture by means of masks, &c., but as I do not believe that this can be done to advantage, I refrain from recommending it.

In the mixing of some colours I use large quantities of white (principally zinc), thereby producing a body colour, and enabling me to produce any tint required. Some colours I use pure, green oxide of chromium, umbers, siennas, and others, but all may be mixed with white, except when used with the first, or rather, only collodion. Black I do not use to any great extent, and principally for moonlight or mourning colours. It may, however, be used for other shades of other colours.

The numerous shades of tissue paper—purples, red, brown, black, &c.—to be procured in the market enable, or may enable, the artist to combine almost any two colours, the one representing the image of the picture, and the other the background, either in harmony or contrast. There is an unlimited field for a display of taste. I generally filter my plain collodion through a proper filter, and then add the pigment. After standing I stir up the deposit of pigment, should there be any, with a glass rod, and thoroughly shake before use. I find no loss in proceeding thus. If the collodion is too thick, I add ether and alcohol; if too thin, more pyroxyline; if the colour is too pale, more pigment.

I sometimes, though rarely, pour coloured collodion on the waxed surface of the plate instead of plain collodion, but I find this a very delicate operation. The plain collodion must be only slightly tinted with a few drops of the coloured collodion above described, otherwise there will be a veil over the image, and those colours known as transparent are only used, and in small quantities, but great care and judgment are required. No body colour—that is, colour mixed with white—can be used. Prints thus treated should be permanent, which is not the case with dyes, neither will the pigment be washed out in the course of manipulation, so that the tint remains as intended. I find all aqueous solutions used as mediums uncertain, and the colour added to them is more or less washed out in the various operations. I believe that the fibrous pyroxyline with collodion, if allowed to dry sufficiently, holds the dry pigments, the same having been thoroughly incorporated with it, and that to a great extent the coloured film so formed is uninjured by water. This, so far as my experience goes, is not the case as regards fluid dyes, or any mode of colouring soluble in water. After the print has been allowed to dry, and has been stripped from the glass, it may be at once plunged into cold water and left there for a few minutes. It can then be nearly dried between blotting paper, and, while still damp, at once be mounted. The wetting of the print reduces the high gloss and produces a semi-matt surface.

Having now particularly described and ascertained the nature and objects of my invention, and in what manner the same is to be performed or carried out in practice, I hereby declare that I claim the said invention of "Improvements in Chromotype and Autotype Photographic Printing, and Colouring or Tinting the same," substantially as herein-before set forth and described, consisting in the manner of mixing pigments thoroughly levigated with a collodion, such collodion so coloured, according to taste or requirement, to be applied as an addition or improvement to the autotype or chromotype process, according to the double transfer system, the coloured collodion being poured on the developed, alum-fixed, washed, and dried plate previous to transfer, my principle being that the collodion cotton film impregnated with dry pigment and properly set will retain the desired colour, notwithstanding the requisite washings, whereas aqueous solutions of any kind will not do so, as far as my experience extends.

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WILDE'S DRY PLATES.

BY DR. S. TH. STEIN.*

It has long been a desideratum among photographers, especially among amateurs, to discover a constant dry process, free from the inconveniences which have hitherto always accompanied all dry processes. These inconveniences arise, in the first place, from the length of time required for exposure, and in the next, from the difficulty of developing—a difficulty which prohibited altogether the use of dry plates by less skilled manipulators, on account of the spots produced on the negative. Herr F. Wilde, of Görlitz, with the aid of numerous experiments, and by an intelligent analysis of the methods in general use, has succeeded in bringing the process to such a state of perfection that, without exaggeration, it may be said we have now under our control a really workable dry plate process, by which, with certainty, we can take photographs of landscapes and of interiors, as well as reproductions of scientific objects.

The time of exposure has been so much shortened that, with a good light, from twenty seconds to two minutes is sufficient to give a vigorous negative full of detail, and with all the half tones perfect. For interiors a longer exposure is required, one of from fifteen to thirty minutes; but as the plates are dry, this is not of importance. Herr Wilde's plates are prepared either with an emulsion, or with a silver-bromide collodion.

According to his instructions the side of the plate which is to receive the emulsion must first be coated with a substratum consisting of a solution of one grain of caoutchouc in from 150 to 200 grams of benzine. When this film is dry, it is again coated with the emulsion in the manner usually employed in laying on iodised collodion. It is next dried on a piece of sheet iron, underneath which a spirit lamp is kept burning; in this way it can be heated without having cause to fear the action of light. When thus prepared, a plate can be used at once, or kept till required. If it be used during very hot weather, it is better to coat it with a preservative to prevent fogging, but this is unnecessary at ordinary temperatures.

Of all the preservative solutions experimented with by Herr Wilde, the one which gave the best results was that which he designates as No. 1; but when he desires to lessen the sensitiveness, and to obtain a strong and intense negative—such as would be required in taking the photograph of an architectural subject—he employs the preservative known as No. 4, which consists of a solution of two grams of tannin in 100 c.c. of water.

Herr Wilde recommends that these preservatives should be used only in hot weather. My own experience does not confirm him on this point; for some time I have used his plates at high atmospheric temperature, without finding the need of any preservative. I have taken photographic views with plates prepared by Herr Wilde himself, as well as with those prepared according to his directions, and though in neither case have I used a preservative, I have always obtained good negatives.

The development was effected by—

Alcohol	20 c.c.
Distilled water	5 ,,
Solution of potassium bromide (five grains of bromide to 75 c.c. of water	10 drops

The plate can be developed a long time after exposure. The above solution is poured on it, and allowed to act for a couple of minutes, after which it must be washed till all greasy lines disappear. Having been thus completely moistened, the plate is developed with the following solutions:—

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* *Bulletin de la Société Francaise de Photographie.*

A.—Pyrogallic acid	5 grams
Alcohol	25 c.c.
Distilled water	25 ,,
B.—Potassium bromide	5 grams
Distilled water	75 ,,
C.—Gelatine	3 grams
Glacial acetic acid	20 c.c.
Distilled water	400 ,,
D.—Ammonium carbonate	25 grams
Distilled water	150 c.c.

Choose compact lumps of the ammonium carbonate, and grind them fine; for dissolving make the water lukewarm.

At the time of using, mix together of—

A.	40 drops
B.	20 ,,
C.	10 to 15 ,,
D.	15 c.c.

While the pyrogallic acid develops the negative and makes the details visible, the potassium bromide prevents a too rapid action, and obviates fogging. The gelatine restrainer preserves the purity of the image, and ammonium carbonate gives the necessary vigour.

For fixing the picture use in the ordinary way sodium hyposulphate, or a weak solution of potassium cyanide.

In conclusion, I cannot from my own experience too highly recommend Wilde's dry plates, both to professional photographers, as well as to those of my colleagues who pursue the art of photography as an aid to their researches in the domain of science.

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SCAMONI'S PROCESS OF PHOTO-GRAVURE

In the *Bulletin* of the Belgian Photographic Association we have a description of Scamoni's process of photo-gravure, which gives the details of the method by which the negatives and positives are prepared, from the latter of which electrotypes are taken to form the plate, whence impressions are pulled in a copper-plate press. The originals which have to be reproduced are carefully touched up, so that the whites are as pure, and the blacks as intense, as possible, and then the negative is taken in the ordinary way, the plate being backed in the camera with damp red blotting-paper, to prevent reflection from the camera or back of the plate.

The negative is developed in the ordinary manner, intensified by mercuric chloride, and varnished. A positive picture is taken in the camera, the negative being carefully screened from any light coming between it and the lens. This is intensified by pyrogallic acid, and afterwards washed with a pure water, to which a little ammonia has been added. It is then immersed in mercuric chloride for half an hour, and again intensified with pyrogallic acid. This is repeated several times. When the intensity of the lines is considerable, the plate is well washed, treated with potassium iodide, and finally with ammonia, the image successively appearing yellow, green, brown, and then violet brown.

The plate is then thoroughly drained, and the image is treated successively with a solution of platinic chloride, auric chloride, ferrous sulphate, and finally by pyrogallic acid, which has the property of solidifying the metallic deposits.

The metallic relief thus obtained is dried over a spirit lamp, and covered with an excessively thin varnish. This varnish, which is evidently a special preparation, retains sufficient tackiness to hold powdered graphite on its surface (the bronze powder now used may be employed instead), which is dusted on in the usual manner. After giving the plate a border of wax, it is placed in an electrotyping bath, and, after a few days, a perfect facsimile in intaglio is obtained.—*Photographic Journal.*

REPRODUCTION BY PHOTOGRAPHY OF LINEAR DRAWINGS, PLANS, ETC.

METHOD OF H. PELLET AND CO.*

By this process copies are obtained directly in dark blue lines on a white ground. For the sensitizing liquid, take—

Oxalic acid	5 grams
Iron perchloride	10 ,,
Water	100 c. c.

though these proportions may be varied according to the degree of sensitiveness required, and the quality of the paper used. The oxalic acid may be replaced by several other vegetable acids. If the paper be not sufficiently sized, a thickening substance, like gelatine, isinglass, gum, or dextrine, may be added to the sensitizing solution. The paper must be dried, and it will then keep in the dark for apparently an indefinite period. It is called (technically), *papier cyanofer*, and it is highly sensitive. A plan which is to be reproduced must be drawn on tracing paper, and a sheet of the sensitive paper placed under it, and exposed. If the operation be conducted under a hot sun, it will take fifteen to thirty seconds to effect the decomposition of the salt when not protected by the black lines of the drawing. In winter, an exposure varying from forty to seventy seconds will be required; in the shade, but with a clear sky, it must last from two to six minutes; while in foggy, rainy, or snowy weather it will extend to from fifteen to forty minutes. Of course, in the course of the same day, the length of the exposure will vary according to the time—that is to say, whether it takes place in the morning or in the evening.

Under the action of light the ferric salt is reduced to a ferrous salt. The latter is not affected by a solution of yellow prussiate of potash, while the part protected by the lines of the drawing will be coloured by it. After exposure develop in a prussiate bath of from fifteen to eighteen per cent., and the drawing will be at once visible in blue lines. If the exposure has been long enough, the paper may be left for a considerable time in the developing bath to increase the definition of the lines; on the contrary, should the exposure have been weak, the proof must be submitted to the influence of the prussiate for a short time only, to avoid the appearance of blue spots caused by unreduced particles of the iron salt. Then wash thoroughly in water, and remove all traces of the protosalt of iron by a bath acidulated with eight to ten per cent. of hydrochloric acid. This will increase the whiteness of the ground and the depth of colour of the lines.

When the drawing on the tracing paper has been made with a very black ink, or with one charged with yellow, the time of exposure may be prolonged; there is no reason to fear any reduction of the salt under very dark lines. In this case the development in the prussiate bath may also be protracted, and when the paper is dry the reproduction is of so dark a blue as to appear black. After treating with the acid, wash again and dry.

To obtain a good copy of a drawing, it is better to take the photograph before the conventional colours have been laid on the tracing paper. In the first place, tinting thin paper often gives rise to creasing; and in the second, should the colours used be dark or non-actinic—like yellow, yellowish-brown, brown-red, &c.—on the photographic copy, there will be patches of blue (more or less intense) corresponding to the tinted parts. If any figured dimensions be inscribed in the tinted portion, they are often quite masked by the blue colour.

This method of taking a direct positive possesses the advantage of giving with great ease and rapidity a photographic reproduction, any part of which can be coloured in the usual conventional tints, and which can also, where necessary, be altered and modified.†

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* *Bulletin de la Societe Francaise de Photographie.*

† We think it necessary to caution our readers that the process above described has been patented in France.—Editor of the *Bulletin de la Societe Francaise.*

The Photographic News.

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THE ALLEGED INSTABILITY OF CARBON PRINTS.

We have deferred further observations on Dr. Van Monckhoven's paper on the assumed instability of carbon prints, and on his comments in reply to our leader on the subject, until after the adjourned debate at the Photographic Society, and until we had made further experiments. Setting aside the debate for a few moments, we will first give attention to his reply to our former observations. In this reply Dr. Monckhoven has, we think, given us the key to his source of error, as we shall presently point out. Let us first, however, answer his last question. He asks us if it would not be more logical to try certain simple experiments, which he indicates, than to indulge in hypotheses. Undoubtedly; this is a question to be decided by facts, not by speculations. But we were under the impression that we had relied solely on facts in our former observations. We based our argument on experiments we had often repeated—experiments, not made in the test-tube, as the worthy Doctor imagines, but practical work with carbon tissue, and still more frequently with bichromated gelatine in various forms. The simplest experiment, and most to the purpose, for testing the reactions which take place in carbon printing, consists in coating a piece of paper with bichromated gelatine, exposing to the light, and then washing. This we have done repeatedly, and always found, after moderately reasonable washing, that we had simply the pale cold green tint of sesqui-oxide of chromium left in the film. Within a week or two we have had confirmation from Dr. Ott, at MM. Braun's establishment in Dornach. Dr. Ott sends us a gelatine film which, when made sensitive with bichromate, had been exposed under a negative, then washed, and the pellicle he sends to us is of the pale cold green tint we have mentioned. He also sent us a sensitive pellicle of gelatine, which we exposed and then washed for a few hours, with precisely the results we had anticipated—the gelatine film became green.

Now, between our experience, confirmed, we will venture to say, by general experience, and that of Dr. Van Monckhoven, is a curious discrepancy. He obtains, after exposure and washing, a yellow image, which is sensitive to light, instead of the green image of sesqui-oxide of chromium. Dr. Van Monckhoven himself, in the candid good faith with which he speaks, unwittingly supplies the explanation. In suggesting to us an experiment which would give us results supporting his position, he says:—"Cover a sheet of paper with bichromated gelatine to which sulphate of baryta is added; allow to dry, expose to light, transfer to glass, develop with warm water, place n alum, wash well several hours, and allow to dry." We have then, he proceeds to say, a yellow image which is still sensitive to light. We have not a doubt that this is so. But the Doctor must permit us to suggest that this method is not analogous to the carbon process in its simplicity. He has superadded something. What business has the sulphate of baryta in the gelatine? This puzzled us at first. But when it was remembered that enamelled paper is used by the Doctor in the single transfer process, and that this enamelled paper is chiefly coated with sulphate of baryta, the truth began to be apparent. It would seem that using such an enamelled paper, and anxious that our experiment should be carried out under similar conditions to his own, he suggested the addition of sulphate of baryta, overlooking the possible reactions between this salt and the chromic salt, and the consequences. Chromate of baryta is a pale yellow salt, which is quite insoluble in water. Once formed in the image, it will not be removed with soaking or washing, and it will slightly discolour under the action of light. We have before us, at the present time, a print transferred to such enamelled paper, which shows perceptible traces of a very pale yellow discolouration in the lights. But, as Dr. Van Monckhoven himself will readily acknowledge, the accidental use of a substance forming an insoluble compound with chromic acid can afford no argument against the stability of carbon prints produced under fair conditions.

Referring to the tests we have made of various prints, the time is, perhaps, too brief to afford decisive conclusions. About five weeks ago we suspended, in a position commanding all the sunlight available, the examples Dr. Van Monckhoven had sent us, with fresh masks. In the five weeks' exposure we have obtained results similar to those obtained by the Doctor himself; that is, in one of the prints alleged to have been produced on Autotype tissue, containing alizarine, we found a change in the loss of rosey purple, leaving the print a good brown. In the print in Dr. Van Monckhoven's tissue, no change. In the print by Mr. J. R. Johnson, illustrating his new patent, no change whatever. In the print furnished by the Autotype Company, produced on their avowedly alizarine coloured tissue, in three weeks' exposure, no change whatever. Referring to the example of change produced by Dr. Van Monckhoven, the Autotype Company very naturally protest against the assumption, without good evidence, that it is on their alizarine tissue. They allege, and we think fairly, that it bears rather the appearance of the results produced on a cochineal tinted tissue.

Referring for a moment again to the use of enamelled paper, we find that the dangers of baryta, or similar salts, are anticipated. In Mr. J. R. Johnson's last specification, where it is mentioned that the usual enamel papers containing baryta, zinc, or lead, combining with chromic acid, are apt to produce stains, kaolin or starch, inert bodies, are to be used instead. This circumstance suggests that Mr. Johnson has foreseen the risk to which Dr. Van Monckhoven has fallen a victim.

The renewed discussion at the Photographic Society on Tuesday night was chiefly interesting from the abundance of testimony as to the stability of carbon prints found in a most extensive display of old prints by the Autotype Company. An interesting letter from Mr. Swan, to whom is due the first reasonable explanation of the reactions in carbon printing, confirmed the statement we made a few weeks ago, as to the decomposition of chromate of chromium by water, leaving in the completed carbon print only the pale green sesqui-oxide of chromium. His experience went further, as he has found that with some examples of tissue the green oxide of chromium was produced by light alone, without washing with water. Mr. Bolas contributed some interesting remarks on the scientific side of the question. He complained that Dr. Van Monckhoven's paper did not give a sufficiently detailed explanation of the preparation of his oxide of iron to obtain satisfactory results. He had tried various experiments with it, and found that no fine red tint could be obtained with hydrated oxide of iron, nothing like the colour to be got by calcination. Further, it was an assumption, not yet supported by proof, that hydrated oxide of iron was absolutely stable, as it was subject to many changes of colour under the action of heat. More than one speaker at the meeting pointed out that at worst the change in carbon prints was but a modification in tint, and that in no instance anything like fading has taken place. This, indeed, Dr. Van Monckhoven, in his note in our pages a fortnight ago, definitely affirms: he says that certain prints will change, but not disappear. There is, in truth, no cause for alarm. We are where we were. We have known, and in these pages the fact has often been affirmed, that prints made with fugitive colours would change. Dr. Van Monckhoven has by his paper called attention to the danger of relying upon alleged permanent colours without careful examination. He has also, we think, done good service in unintentionally showing that single transfers on paper enamelled with sulphate of baryta are dangerous, as an insoluble compound is formed with the chromic acid, and has thus incidentally given special point to the clause in Mr. Johnson's patent pointing out an inert substance for producing such enamel surface. The photographic community at large are undoubtedly indebted in various ways to the esteemed Doctor's paper.

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PATIENCE IN DRY PLATE PHOTOGRAPHY.

The advent of sunny days and clear skies is welcome to none more than the dry plate photographer. He has patched up his dark tent, if he carries one, during the winter, and corrected the defects of his apparatus, or possibly perfected that dry plate process which, for sensitiveness and simplicity, is to beat all the world. He is only waiting for the spring, or early summer, to begin work, for the time when the foliage is just set, and when there are still masses of white cloud floating about to aid in softening sunlight effects, and adding transparency to his shadows. If he can get a still day, when the warm sunshine comes and goes, lighting up hilly landscapes like patchwork, the horizon clear and transparent from recent rains, and the distant cliffs sharp and bright against the sky, it is all he wants, unless, indeed, he has it in his mind to have a bit of water in his picture. Then he seeks out some placid pool, or lazy stretch of river where contrast is afforded by the yellow reeds and overhanging green of the willow, and sets down his camera where a fallen tree or a patch of bushes composes a picturesque foreground. In all probability he has had the spot in his eye for the past few months, and has studied the standpoints half-a-dozen times, in which case there is little left in the way of adjusting apparatus and focussing. He knows what he will get long before he has developed the plate, and congratulates himself already, as if the picture were hanging up in the library at home.

But he must be a patient man. No dry plate worker was ever successful in his calling who was flighty and hurried in his manipulations. It is like angling. No fisherman ever yet had a good day's bottom-fishing who could not go to work systematically, or had a deficiency of patience. We have heard of a dry plate photographer who actually desisted from his work to apply a coating of whitewash to a cottage, in order to throw the high light of his picture in a certain point, and the result was one well worth waiting for. A fine picture of the Thames near Cookham, in our possession, would have been sadly marred by an ugly fence that occupies a prominent position in it, had not the photographer spent some time in tastefully twining a bit of ivy round one of the posts, and thus broken its rigid outline. Now it is as if the post had actually been chosen as an appropriate foreground, instead of being, as it was, an adjunct impossible of removal. Again, there is a light breeze, or a big cloud that for the moment gives an inky aspect to the water, and chills the whole pleasant scene before you. Exposure at that instant would have been to render your former work vain, and to produce a mediocre picture, instead of one full of life and brightness. You must sit down and bide your time. Take a book with you, if you like, and read. But do not expose after all your trouble. The chances are that by the time you have removed your plate, the proper moment will have arrived. Half in sunshine, half in shadow, will produce your best picture, in which the shadows will be transparent, and the atmosphere transparent.

And patience, more than ever, is necessary in the development of dry plates. Do not hurry. Inform yourself well beforehand what it is you are about to develop. Is there much dark foliage about it that will require working up, or does it present a delicate skyline which will rapidly fog? Proceed slowly and cautiously, but when the right degree of development has been reached, then act promptly. Do not allow your shades of distance to fog by pushing to extremes; intensifying can always be managed afterwards when the picture is fixed, you must remember. At the same time, in the case of foliage and undergrowth, they are nothing unless fully developed, in the same way as their beauty is wholly lost if there has been any shaking during exposure. In a word, if you cannot be patient, you will never be a good dry plate photographer.

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EXAMINATIONS IN SCIENCE.

Several of our correspondents have made enquires as to the nature and object of the examinations to which we have made recent allusion in connection with the grant by the Council of the Photographic Society of a sum for prizes in connection with a photographic technical examination. The following article, discussing certain phases of the subject, in our esteemed contemporary, the *English Mechanic*, will afford much information on the subject;—

"It will be remembered that a few years ago the Society of Arts established a series of Technological Examinations, connected in a manner with the examinations of the Science and Art Department, South Kensington—that is, the candidates were required to pass in general science before presenting themselves for examination in the technology of their trades or arts under the scheme promulgated by the Society. A very few years have sufficed to show that even the handsome prizes offered have failed to draw a respectable number of competitors; for, starting in 1873 with five subjects, only six competitors appeared; and in 1877 there were only 68 for 13 subjects—all those being entered in seven of the thirteen subjects for which the Society offered prizes. Indeed, throughout the whole period of the existence of these technological examinations, some subjects have been completely neglected, for not a single candidate has appeared in paper manufacture, glass manufacture, silk-dyeing, or calico-bleaching. These facts have attracted the attention of Mr. Twining, who has been watching the development of the scheme with almost paternal solicitude, and he has accordingly issued a tract on the elementary science examinations of the Department, considered in relation to the technological examinations of the Society, the present time—when the City Guilds exhibit a willingness to take up the work and extend it as far as they are able—offering a favourable opportunity for the promulgation of the opinions of those who are most deeply interested in the matter. Mr. Twining has always urged that the standards in view were too high to be popular, and his opinion has been borne out by the result so far; but whether other causes besides the difficulty and incomprehensibility of the science papers at South Kensington have not been at work remains to be proved. From his point of view Mr. Twining makes out a good case against the elementary science examinations, which may be very well adapted to young students, but are scarcely calculated to attract those who may be well able to pass the technological examinations of the Society. In 1876 seventeen of the candidates were declared to possess technical knowledge sufficient to have entitled them to technological certificates if they had been able to pass the examination in science; and yet fifteen of those competitors were attendants at science classes. The opportunites afforded nowadays for obtaining a full knowledge of any of the industries in the list of the technological examinations are not so numerous and so easy of acceptance as some are inclined to think. The subdivision of labour is carried out almost to its fullest extent, even in small factories, and apprentices are now rarely taught the 'whole art and mystery;' and even where they are, some branches are of necessity learned by rote, by mere imitation, without any explanation of the rationale of the operations that are performed. With the existing difficulty experienced in acquiring a thorough knowledge of all the branches of an industry—say, for instance, alkali manufacture—the examination in general science should at least be as simple as possible, and be calculated to lead out the mental abilities of the practical man, and teach him by thought and reason the methods of applying first principles to the processes and operations of his trade.

"The 'general science' syllabus is taken from the 'Science Directory' just as it stands, and just as it was prepared long before the technological examinations were thought of. In the elementary, advanced, and honours stage, it has been mainly devised for training, in the pursuit of theory and research, minds already possessing a certain amount of culture; and it is not adapted to the requirements and capabilities of the majority of artisans who would feel encouraged to 'go in' for the technological examinations if they could obtain the requisite groundwork of general science in a plain and utilitarian form. It is no doubt true that better things may be expected in the rising generation, but there is no question that Mr. Twining has formed a correct estimate of the great body of artisans and industrials, when he says that for them to appreciate science its value must be brought home to their perception in a practical and at the same time a palatable way. 'They are then nowise slow to appreciate it. They will study with satisfaction a book written in familiar style, that gives them woodcuts in lieu of hard words, and they will listen with the most exemplary earnestness to a colloquial discourse enlivened with diagrams and experiments.' But Mr. Twining thinks it would be futile to expect a tired artisan to trouble himself much about instruction the connection of which with his trade he cannot appreciate, and which, moreover, does not present itself in a pleasant form. There are many thousands who ought to be able to pass an elementary technological examination, and amongst them many hundreds would push on to the advanced grade. But if the workman in the alkali trade is met at the outset of his studies with the necessity of learning the notation of modern chemistry, he is apt to shrink from the task, and trudge along in the old groove. Mr. Twining says that many an uneducated workman is quick at the perception of the outward appearance of bodies, and will note and remember such inward properties as may be rendered visible to him by experiments. By the time that he has become acquainted with the salient facts of inorganic chemistry he will begin to understand the advantage of expressing reactions by formulas, and the notation is then appreciated. Prof. Bunsen does not trouble a student with formulæ and atomic weights during the first three months of his course, and his students are better able to appreciate his teachings than the vast majority of practically uneducated artisans. But what is expected of the worker in an alkali factory before he can pass in the technological examination? He must give a definition of chemistry and of chemical action, of the indestructibility of matter; must explain the laws of chemical combination by weight and by volume, answer questions on the principles of chemical nomenclature, symbolic notation, graphic notation, and chemical formulæ and equations, and must be fairly well acquainted with the theory of atomicity. To be brief, the charge brought against the syllabus of the South Kensington examiners is simply that it is utterly unsuited to the wants of those artisans and others who have been attracted by the offers of the Society of Arts. Metals and their compounds, a knowledge of which one would suppose to be imperatively necessary in a candidate for a technological certificate, appear only in the second-stage syllabus, and are there classified according to theoretical rather than practical analogies; so that the industrials who examine the syllabus to obtain an idea of what they are expected to know, find that, instead of plain facts and simple principles which may be directly applied to useful purposes, they are invited to commence a course of regular theoretical training. That is the point on which Mr. Twining bases his criticism. It is possible that with the better public education now given to every boy in the country the rising generation will have no difficulty in appreciating the advantages of even such a modicum of theoretical knowledge as is required in the elementary grade; but meantime all the technical ability which exists amongst our present workers is confined to the old ruts, for the want of a suitable scheme for attracting attention to the scientific principles which are at the base of nearly every industry. In the elementary stage, our alkali worker will learn little or nothing that is useful to him in his business, and the same is true for workers in steel, pottery, glass, &c.

"In the dyeing and printing of calico, &c., the chemical knowledge required is mainly in the organic branch, and yet, according to Mr. Twining, neither of the three elementary syllabuses prescribes organic chemistry. The question seems to be simply—Shall the elementary science examination be reduced to the level of the average artisan, or must he elevate himself until he can appreciate the present text-books? If the latter course is decided upon Mr. Twining warns us that very few of the industrial classes will respond to the invitation given them; while, on the contrary, if the examination is adapted to their capacities, many thousands may be expected to avail themselves of the advantages offered to them. 'In most manuals of organic chemistry,' says Mr. Twining, 'a purely theoretical classification places far apart substances of almost identical industrial functions, and brings together bodies of the most dissimilar properties and appearance; whilst many substances of general interest and vast utility—such as resins, balsams, and several dye-stuffs—are ignored, because they do not fit into any of the series of mathematical pigeonholes to which nature is expected to conform her products.' Mr. Twining proposes that syllabuses of special examinations, to be called 'Artisans' Science Examinations,' should be prepared to afford an opportunity for artisans to obtain the 'general science' certificate required by the Society of Arts for their technological examination; that these science examinations should be adapted to as many trades as possible; that each trade should have two special science examinations corresponding to the two lower technological examinations; that each syllabus should designate seriatim all the science subjects necessary; and that suitable textbooks should be indicated, and, if non-existent, should be provided at a low price. These are the principal features of the scheme suggested by Mr. Twining, which undoubtedly merits the attention of all interested in the development of technical education, and is especially deserving of consideration by the City guilds and the Society of Arts. The tract can be obtained at Goodman's, 407, Strand, or of the Secretary, Economic Museum, Twickenham."

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ON THE SO-CALLED FADING OF CARBON PRINTS.

BY. G. CROUGHTON.

Dr. Monckhoven's paper, read before the Photographic Society of Great Britain, is at first sight calculated to injure the cause of carbon printing, by giving its opponents an argument against it. They will say that its only recommendation (permanency) is, upon high authority, denied, and that, after all, there is no gain in giving up silver printing for carbon, for, if the manipulator is only careful enough in the process of fixing and washing, prints have been, and can be, produced which withstand both the action of time and atmosphere; while, on the contrary, upon Dr. Monckhoven's showing, the carbon manipulator has no control whatever over the result of all his labour and pains. He must use the tissue as sent out from the manufacturers (unless he tries making his own tissue, which few will care to do), and upon them rests the whole responsibility of the fading of carbon prints.

Thus broadly stated, the charge is a grave one, and calculated, as I have said before, to seriously injure the cause of carbon printing. Dr. Monckhoven's well-known skill and experience make his arguments come with much greater weight than they would have if propounded by a less learned authority, but I venture to say that there are considerations which materially lessen the weight of those arguments. The details of his search into the chemical reactions of the chromic salts upon the pigments used with the gelatine in the manufacture of carbon tissue are most interesting and valuable, but the conclusions arrived at are, I think (with all due deference to Dr. Monckhoven), much over-stated. And then we have the fact that he is in the market as a maker of tissue, and therefore interested in finding defects in those tissues already in the market. We have, therefore, this fact to weigh against his statement as to the non-permanence of the Autotype tissue. Of the value of the iron salt, instead of the extract of madder, as a pigment to be mixed with the carbon proper, to counteract the green tint which is produced by the use of black or carbon only, I can, of course, say nothing; but if they are all Dr. Monckhoven states, he is entitled to the best thanks of all photographers interested in carbon printing. What I take exception to is the statement that Autotype prints fade, when it is well known that it is impossible for a carbon print to fade—that is, speaking of fading as it is known to all silver printers—and until the advent of Mons. Lambert's chromotype process no one ever heard of a carbon print fading; I suppose, for the simple reason that the Autotype Company (who had the benefit of the experience of one of the first-class colour makers in this country, Mr. Winsor) did not sacrifice permanency to fleeting beauty in colour. The use of some of Mons. Lambert's bright-coloured tissues, warmest tints, carmine, or other fugitive colours, has demonstrated the fact that carbon prints can change colour—not fade. But I have some Autotype prints—some prepared by Mr. Johnson when he was head of the chemical department, some by myself—upon every kind of base used by the artist—panel, canvas, ivory, opal, drawing-paper, &c., done to illustrate my paper read before the South London Photographic Society, upon "Carbon as a Basis for Finished Work," some eight or nine years ago—and they are as fresh and bright as when first done. They are good, warm blacks and browns, and, as they were done before the rage for fancy tints came about, they have stood without the slightest change either in the lights or in the shadows. I think, therefore, that the title of the paper should have been, instead of "Fading of Carbon Prints," "Change of Colour in Carbon Prints," for in the worst of cases we see nothing like the fading of silver prints. Of course, if indigo and carmine are mixed with carbon (lamp black) to produce a pretty purple, the result of exposing a print—as recommended by Dr. Monckhoven—would be to change the purple to a dirty greenish black, but that would not be fading as understood by our experience of silver printing. The action of soda in conjunction with the alum for fixing has been communicated by the Autotype Company to their licencees for some time, and I will guarantee that if their purple tissue be used according to the directions sent out with every band, Dr. Monckhoven's experiment of covering one half of the picture, and then exposing to sunlight for a stated time, may be tried without any change whatever being perceptible.

DRY-PLATE DEVELOPER.

BY M. QUEVAL.*

When a dry plate is coated with a preservative principally or entirely consisting of gallic acid, it can be rapidly developed by the following solution:—

Distilled water	100 c.c.
Crystallized silver nitrate	4 grams
Acetic acid	4 ,,

Place the plate, film downwards, in a trough of rain-water, so as to moisten the whole of the film without unequally removing the preservative, then pour all over it the above solution; the picture will quickly appear, and will generally be completely developed. It must be carefully watched, and washed as soon as it seems to be sufficiently intense.

All photographers who are in the habit of developing dry plates have observed that when too much silver nitrate has been added to the developer, the intense blacks of the negatives were riddled with small holes. The formula which I have given above does not produce this result, even though the proportion of nitrate be much larger; the reason of this apparent paradox I am not in a position to explain.

I have only tried this developer with stereoscopic positives on albumen or albumenized collodion, and I am bound to add that I have obtained very unequal results. I therefore introduce it to public notice with some hesitation, though I believe that by washing off the preservative and by modifying the proportion of the ingredients, a very rapid and energetic development will be obtained.

Correspondence.

GLASS CLEANING.

Dear Sir,—I beg most emphatically to differ from the writer of "Whims and Fancies of a Landscape Photographer," in your issue of the 29th ult., pp. 152 to 154, where he says:—"The use of a substratum of albumen has been highly recommended, and, though doubtless efficacious, may carry injurious organic matter into the bath. For my part, I am inclined to look upon albumen as an apology for cleanliness, and a lazy way of getting over the trouble of plate cleaning. Such expedients are not advisable, and are too much like putting on white gloves to hide dirty fingers, or buttoning up a vest to hide a dirty shirt front."

Now, sir, it is evident to my mind that the person who could make such a statement as that knows little or nothing about the use of a substratum of albumen. There can be no doubt that if the albumen be applied to the wrong side of the glass, "injurious organic matter" must be carried into the bath; but if it be applied, as it should be, to that side only which is to hold the image, and if the collodion also be deposited all over the glass, then, not only it may not, but cannot be carried into the bath. Not only is the use of albumen not "an apology for cleanliness," nor "a lazy way of getting over the trouble of plate cleaning," but, in my opinion, it is the easiest, safest, and only reliable method of procuring uniformly clean plates.

There is one word here which requires a little separate handling; I mean the word "trouble"—the "*trouble* of plate cleaning." That is a word which I am sure, from my own experience, I may confidently affirm (as it stands related to plate cleaning), that the man who uses albumen as a preliminary coating has for ever banished from his vocabulary. When I read it in your correspondent's paper I was reminded of its old, ominous sound. Yes; with the alcohol, ammonia, cotton-wool, rag, chamois leather, swan's down, properly washed linen cloths, and the rest of the litter, plate cleaning was, is, and always will be, a "trouble." Your correspondent admits that. But the "trouble," I am thankful to say, has entirely disappeared now that albumen is employed.

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* *Bulletin Belge.*

There was one consideration—a consideration of importance, too, especially to a landscape photographer—which strongly induced me to give albumen a trial, and to persevere in its use. Your correspondent will, I am sure, admit that sometimes when we are not disposed to have our whims and fancies there is something, however, which has very peculiar ones—I mean the collodion film—and one of these very peculiar whims and fancies is—of course, under certain conditions—an unaccountable preference for oblivion, rather than remain on the road to fame. Just in that moment when the operator felt inclined to boast in the possession of a really good negative, this very peculiar whim has led it to pass away like a thing of naught. Now I must confess that that is a whim I never cared about. I found, also, that much labour bestowed upon plate cleaning never prevented it, but albumen did. Now I only speak the truth when I say that I much prefer in this my own whim, which is, to secure the film.

I am not a solitary individual loud in the praises of albumen. Within my little circle there are many of my brethren equally satisfied as to the claims of such a substratum as albumen affords.

In conclusion, I should like to mention, for the good of any one who is ignorant of it, the use of the Blanchard brush as recommended in "Studio Hints," in your issue of March 8th, page 110. The saving of time (and that, I am sure, is a really practical whim) effected in the use of this ingenious little article is immense.—I am, yours truly,

J. Kay.

THE LAW OF DIMINUTION IN DISTANCES.

Dear Sir,—You must have observed that the active-minded photographer is not seldom an ingenuous and an unconsciously comical fellow. His intuition, like that of all geniuses who are not logical or philosophical, is short-sighted and amusing. Every week or two your columns attest the fact. Not very long ago a Northern photographer attempted to prove, to the members of his society, the permanence of certain colours by infusions of various coloured leaves. Still more recently, a rattling writer of yours, by a turn of the kaleidoscope, made a dive at the theory of light by juggling with coloured pieces of glass! After the turning of such somersaults, it is no wonder that they find that "things are not what they seem."

Considering this idiosyncrasy, it is but natural to expect the failure of all such seeing the length and breadth of the law of perspective. The subject is, no doubt, brimful of the magic of surprises, yet there is nothing more easy to understand, if approached from the right point of view. Let anyone ask himself, Is the law of diminution in distances suspended vertically or horizontally? To answer this question except in the affirmative would betray at once a want of true observation. Then what follows? Simply this: that every line larger than our own small point of vision must diminish (or, if you will, converge) according to the ratio of its distance from the eye. Bearing this in mind, one would have no need for illustration; but, for the sake of making the matter clearer to the tyro, we will take Mr. Cocking's own "row of houses on the opposite side of the way, and extending sideways." Mark, that his honest eye tells him that "the roof line appears to converge," but that "the true (!) representation of it must be perfectly horizontal, or straight"!

But suppose now (and here again lies a secret explanation of the whole matter) that the "row of houses on the opposite side of the way" took the form of an absolute circle around the spectator—what would you find? Simply this: no convergence in the roof line, because the running horizontal line confronted and met the eye always at the same distance.

Need one say more, unless it be the utterance of a hope that Mr. Sawyer will, at the next meeting of the Photographic Society of Great Britain, be able to carry the members truth-wise?—Yours, &c., John Patrick.

Wemyssfield, Kirkcaldy.

PERMANENCE OF DAGUERREOTYPES.

Dear Sir,—Murder will out, and so will the truth come to light sooner or later. I am now a photographer of thirty years standing, and consider that my long experience, almost from the first days of Daguerreotype, entitles me to say a word upon the permanence of the above.

I think it will be found, upon faithful inquiry after truth, that the Daguerreotype, when properly executed, is not only the most permanent, but the only kind of photography out of the many processes that have been worked from time to time, that really is of undoubted permanence, and which will not fade by any length of time or climate. Tarnish they will, certainly, when kept in sulphurous air, as it is known that all silver articles will do, which is simply the silver plate, and not in any way affecting the picture, excepting by slightly obscuring it in course of years; but this is of little moment when I tell you that it can be removed in a few minutes by pouring over it a pretty strong solution of cyanide of potassium in water, and washing under a tap, and drying over a spirit lamp. This operation does not take more than a few minutes to an experienced hand; the faded Daguerreotype is then restored to its former brightness, not in the least affected in any way. As a further proof of their permanency, I may just mention that I have many fine specimens of various sizes that have been done by myself from twenty-five to thirty years, all of which are as brilliant as the first day they were done, and several of them were exposed outside my door in a show case, with the sun blazing upon them, for at least seven years, and without undergoing the slightest change whatever. When they were taken out of their mountings no trace of difference was visible between the part exposed and that under the passe-partout. I would like to know what other kind of photograph can we say as much of—certainly not carbon prints. In my humble opinion, we] have little to hope for from them, and I have cause for saying so. However, a short time will prove to us all.

I trust you will excuse my taking up so much of your valuable space, but, as this is the first time I have had the pleasure of doing so over this long period, I have no doubt you will find me space to record my earnest and faithful attachment to my first love,

Old Daguerreotype.

Proceedings of Societies.

Photographic Society of Great Britain.

The usual meeting of this Society was held in the Water Colour Gallery on the evening of Tuesday, April 2nd, Mr. J. Glaisher, F.R.S., in the chair.

The minutes of a preceding meeting were read and confirmed, and the following gentlemen elected members of the Society: Messrs. C. Harris, H. N. White, Wratten, Webster, Mansell, Field, Newland, Payne Jennings, Nelson, Dale, Sampson.

Mr. Sebastian Davis read the conditions of the Dry Plate Competition for Mr. Paget's £50 prize. We will publish these in our next.

The President then proceeded, in the midst of applause, to present to Captain Abney the Medal of Progress, in terms of high and well-deserved praise.

Captain Abney responded with deep feeling, expressing his sense of unworthiness of the honour, and trusting that the medal would not lose lustre from being awarded to himself in its birth.

The Chairman called attention to the splendid display of pictures sent by the Autotype Company. He also read a letter from Mrs. Spencer, expressing her husband's regret that illness prevented him from being present to take part in the carbon discussion.

A paper by Mr. Walter Bird (who was absent) was read by Captain Abney. Resuming the discussion on the fading of carbon prints, he said the allegation that such prints fade was unsupported by facts, and hence the title of Dr. Van Monckhoven's paper was misleading. Carbon prints did not fade, although there might be in some an alteration in tint. The carbon itself was absolutely permanent.

Mr. **Sawyer** read an interesting letter from Mr. Swan, saying that undoubtedly all prints in which carmine was employed would change, and its use should be abandoned. In all his experiments with bichromate gelatine he found, after exposure, that washing the green oxide of chromium was all that remained. In some samples of tissue this was produced by the action of light alone without washing.

Mr. S. **Fry** thought that there was nothing to produce alarm in the statements and examples sent by Dr. Van Monckhoven to the last meeting. Carbon was stable, there was no doubt; and carbon printing would be universal by-and-by, but not yet. There were still manipulatory difficulties in the way.

Mr. **Woodbury**, in answer to the Chairman, said that in his prints there was no chromium compound, and he had had little experience in carbon printing.

Mr. **Bolas** said Dr. Monckhoven implied that purple tints could be got with iron. He had made many experiments, and had obtained nothing better than the yellowish brick dust tints, nothing like the red tints obtained by calcination. Dr. Monckhoven did not give sufficient working details, and he referred to the oxides of other metals, but did not say what they were; but suppose the fine red tint were obtained with hydrated oxide of iron, there was no security that it would be absolutely stable. It would probably change with heat. He intended to experiment further with it, and would report. In speaking of change, it must be borne in mind that almost everything changes under the action of light, even the plain paper upon which a picture is produced.

Col. **Stuart Wortley** had printed very many transparencies in carbon, and these had been exposed in a window for eighteen months, and he was not able to detect any change in them.

Mr. **Sawyer** gave some interesting historical details of the colours used to tint the carbon picture, and stated that in his experience the alizarine pictures did not change, or, at any rate, easily.

Mr. **Spiller** asked if the Autotype Company had tried the extra scarlet alizarine, which was nearly as brilliant as carmine.

Mr. **Sawyer** said there were two alizarines, the blue and the red. They used the red, which was, he presumed, the scarlet to which Mr. Spiller referred.

Mr. **Spiller** said there were six different tints: that to which he referred was known as extra scarlet.

The **Chairman** said that although the discussion had been instructive, there was room to take it further, and it might be resumed when Dr. Van Monckhoven sent his further paper to which reference was made. As the hour was late, Mr. England's paper on dry plates would be postponed until next meeting. He called attention to some fine examples of mechanical printing by Mr. Dallas.

The meeting was then adjourned until May 14th.

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held on Thursday evening, the 28th ult., at the Free Public Library, William Brown Street, Mr. H. A. **Wharmby**, President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. J. C. Forrest was elected a member of the Association.

A communication was read from Mr. J. A. Forrest, stating that, as this was an age for exhuming old photographic ideas, and dressing them up to the times, he had sent some pictures treated in the following manner:—Take a strongly-printed photograph on paper, and saturate it from the back with a rag dipped in castor oil. Carefully rub off all excess from the surface after obtaining thorough transparency. Take a piece of glass an inch larger all round than the print, pour upon it dilute Russian glue, and then squeegee the print and glass together. Allow it to dry, and then work in artist's oil colours from the back until you get the proper effect from the front. The examples sent showed that both landscapes and portraits could be effectively coloured by the above method without any great skill being required.

The exhibition of Mr. J. H. T. Ellerbeck's drying-box excited considerable discussion as to which was the best form and mode of heating drying-boxes. Mr. Ellerbeck described his drying-box as follows:—In a chemical laboratory is used a water oven for drying precipitates, &c., at a certain temperature. Finding a want for drying plates quickly, and at the same time away from light and the action of deleterious fumes, I have made on the same principle a water oven for this purpose, differing only in having in the inside, instead of one shelf, a number of ledges for the reception of the emulsionized plates. As this apparatus may not be much known, a slight description may be serviceable to some. A Milner's safe is a good model. It consists of a double box of metal, with an open tube at top for the admittance of water, which surrounds on all sides, except the front, the inner case, the sides of which are shelved or grooved the same as an upright plate-box. From the top of the inner chamber is a pipe leading to the outer atmosphere for the escape of fumes and to cause a current of warm air throughout. To effect this more advantageously I have made the box two or three inches deeper than the plate itself, so that when this latter is inserted it will be that distance away from the entrance. If the next plate be placed flush with the door, and each alternately in and out, the hot air is made to pass over each plate to its full length. The drying thus takes place in a few minutes. I have made mine for thirty-two plates, but this is hardly necessary, for amateurs do not usually make this quantity in a night. Still it is best to be on the safe side, and the extra space allows all to be left till the evening's work is done, and you need not stop in the middle to put away those already finished. The whole had better be of copper, when it will last a lifetime. Tin is, of course, cheaper at the first, but dearer in the end, as being liable to rust and wear out. The diagram will show better than any description the plan. The distance between the inner and outer metal need not be an inch, and a thermometer can be fixed with the register outside for any delicate work. Gelatine workers will find this oven of value if the shelves are properly levelled, and it will be found useful for many other purposes, such as drying chemicals, evaporations, &c. The heat can best be kept up by a gas boiler to any required temperature.

The Rev. H. J. **Palmer** then gave a practical demonstration of his method of preparing and developing the "Palmer" films, which was watched with the greatest interest by the members. (see page 158.)

The demonstration was also illustrated by a number of film negatives, showing conclusively their excellence and portability.

The receipt of the *Bulletin Belge* and the *St. Louis Practical Photographer* was announced by the Secretary.

After votes of thanks had been cordially given to the different exhibitors, a large number of transparencies were shown by the aid of the Society's lantern. Some from albumen plates by Mr. Lund, of Manchester, and some of animals taken on Kennett's gelatine plates by Mr. L. W. Weber, were greatly admired.

The meeting was afterwards adjourned until the 25th instant.

Talk in the Studio.

Photographic Action.—At the Court of Exchequer, on Tuesday last, the case of Coles *v.* Dickinson was heard before Mr. Baron Huddleston, in which the plaintiff, T. Coles, described as a photographer, carrying on business at 280, Euston Road, sued the defendant, the landlord of the "Grasshopper" public house, to recover the sum of £200 damages for false imprisonment and slander. Mr. Talford Salter appeared as counsel for the plaintiff, and Mr. Mason for the defence. Mr. Salter, in opening the case for the jury, said that his client went to Brighton with an excursion ticket on the 10th of August last, and after having a bath and a sail, found that the Lewes Races were on, and at once proceeded thither. His client had witnessed two races, and was returning to Brighton by a wagonette, and being desirous of catching a train by which his return ticket was available, jumped out of the carriage, and was followed by the defendant, who gave him into custody on a charge of stealing from him a diamond pin worth twenty guineas. The plaintiff was called, who said he had been for sixteen hours in the police cell, was handcuffed and taken back to Lewes; but having given reference to a person in Brighton who knew him, he was at once released; and it was in consequence of the indignity he had suffered that the present action was brought. The plaintiff said he had been for eleven years in business on the same premises, and was well known, and he brought the present action purely on principle, to vindicate his character amongst his neighbours, who had all heard of the transaction. It was urged on the part of the defendant that he had reasonable grounds for giving the plaintiff into custody; and in point of law, if a felony had been committed, and the defendant had reasonable grounds for giving plaintiff into custody, he was at liberty to do so. The defendant's evidence and that of his witnesses having been concluded, the learned Baron commented severely on the unsatisfactory state of the evidence for the defence, and having pointed out to the jury that the damages in this case, if they believed the plaintiff's statement, should not be vindictive, but exemplary, and as such would enable him to tell his friends that his character was not injured by the treatment he had received at the defendant's hands, and would enable him to show by their verdict that the world would consider it also. The jury, without retiring, returned a verdict in favour of the plaintiff for £100 damages. His Lordship certified as to costs.

Stealing Photographic Apparatus.—We learn with regret from Mr. Solomon that he has just had to prosecute one of his assistants, named Paul, for dishonesty. On Wednesday, at Bow Street, he was condemned to six months' imprisonment with hard labour.

"**The Citizen.**"—Those of our readers residing in the City of London will be interested to learn that a new journal, devoted to the interests of the City, will appear shortly. Curiously enough, the most important city in the world has hitherto had but one journal especially devoted to its affairs. The new journal, *The Citizen*, is in able hands, and with such a field we predict for their work great success.

New Catalogue.—We have just received the trade price list of photographic chemicals, apparatus, and accessories issued by Messrs. G. Mason and Co., of Glasgow. Every photographer will be glad to possess a copy. It is very comprehensive as a catalogue, is descriptive in many cases, and gives some good formulæ. The portion devoted to a description of chemicals, their uses, origin, poisonous action, and antidotes, is quite original in idea, and both interesting and valuable.

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To Correspondents.

W. J. A. G.—In our own practice we have generally made up th saturated iron solution without any addition of acid. If aceti acid be added, especially if the solution have been made with common water containing carbonates, a portion of acetate of iron is often formed, which will tend to brilliancy and intensity, but not to rapidity. When you find an old developer work too slowly, the simple remedy is to add to it some freshly mixed. It is a good thing to keep the stock bottle of saturated solution well corked, and turned upside down, to prevent contact with the air, which tends to peroxidation, and this, though favourable to clearness and rigour, is apt to produce slowness.

Australia.—There is not, so far as we know, any photographic journal published in Australia. There have been many communications in our pages during the last two years, referring to photography in Australia. In our issue for December 1st, 1876, there is an article containing much information, and there have been others from the same pen since.

Fred Warner.—Full details of the collodion transfer process would occupy more space than that devoted to the whole of our "Answers to Correspondents." We have published many articles on the subject, both in the News and Year-Books. We can give you helps in any special difficulty in this column; but for the full details you must refer to some article on the subject. In the Photographic News of March 21st, 1873, there is a good practical article on the subject.

W. J. B.—If for sitting figures, six feet square will serve. If for standing figures, eight feet high. The colour should be a light grey.

Reflector.—It depends on the purpose of the blinds, as to what is the best material. If for absolute shade, a somewhat dark blue is often used with advantage. If also to serve as reflectors, then white calico. If to cut off direct sunlight, but transmit the rays as diffused light, then thin transparent cloth, used for and known as tracing cloth, answers best. It is important to know, first of all, what effects you wish to produce.

A Learner.—We do not precisely understand your question. Do you mean a blue black tone, or blue prints? The prints to which you refer, so far as we know them, are usually of a black tone, produced by deep printing and deep toning in the gold bath, using brilliant negatives. Rich brilliant tones cannot be secured with poor negatives. You must have clear brilliant negatives from which to secure brilliant well-toned prints. A toning bath made with three grains of chloride of gold and two grains of chloride of lime in a pint of water, used forty-eight hours after mixing, will aid in securing black tones.

Lights and Shadows.—In our last Year-Book Mr. Henry Cooper gives his latest experience in printing on silk; you will find his communication on page 46.

W. T. Wilkinson.—Many thanks. We shall have a few words on the prints in our next. Unless our memory is at fault, we received and noticed the sunset pictures to which you refer, last year.

R. M. F.—Hydrochloric acid is better than common salt for precipitating silver as a chloride. When the solution is very dilute, it is at times difficult to get the chloride to go down. The addition of a few drops of nitric acid aids in getting the precipitate down.

W. W.—The combined focus is the equivalent focus of the combination. It is impossible to tell you what the back focus will be of a lens with a known equivalent focus, as much will depend on the construction of the lens; but it will be very easily ascertained by trial.

F. Hopkins.—We are puzzled to discover the cause of the mottled markings on your card. They are due to a mechanical rather than a chemical cause, we think, but we should in all cases avoid the sugar and water.

R. V.—The paper you enclose may be pretty good, but it stinks very badly. The fact that the albumen is dissolved after floating a few sheets on the silver bath suggests that the albumen is highly salted, and rapidly weakens the bath, and that the bath has not much excess of silver to begin with. Whenever the albumen is dissolved more silver is wanted.

J. J.—Your collodion is old, and has probably got thick from the evaporation of ether, from frequent uncorking of the bottle. Add a little pure ether.

R. M.—The prize dry process, when decided, will be published and given to the public. That will be some time next year. 2. There will be an exhibition as usual. Details will be published in due time.

Z.—A second-hand lens by a good maker is as good as a new one, provided it has not been actually injured. Ordinary wear and tear will not injure a lens, and it does not deteriorate with use.

L. Norman.—The article alluded to in the one to which you referred did not appear in our columns, but in those of an American journal.

Several Correspondents in our next.

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METEOROLOGICAL REPORT FOR FEBRUARY.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven, 36 feet above sea-level.

Date.	Barometric Pressure.			Temperature in the Shade.			Remarks.
	Morning	Noon.	Night.	Morning	Noon.	Night.	
1	30·40	30·34	30·30	34°	40°	39°	Small rain this evening. Gloomy all [day
2	30·28	30·27	30·25	39	43·5	36	Fair, but gloomy and foggy
3	30·28	30·30	30·33	34	38·5	38	Fair, but gloomy. Very foggy all day
4	30·33	30·34	30·36	39	43	42·5	Fair, but gloomy and foggy
5	30·34	30·37	30·36	42·5	44	42	Fair, but gloomy and foggy
6	30·32	30·32	30·32	36	39	41·5	Fair, but gloomy, and rather foggy
7	30·33	30·35	30·38	42	46	39	Fair, but gloomy
8	30·40	30·33	30·28	39	46	41	Fair, but gloomy
9	30·12	30·00	29·99	38·5	42	38	Fair, but gloomy and foggy
10	29·80	29·78	29·78	38·5	42	39·5	Fair, but gloomy and foggy
11	29·80	29·88	29·89	29	42	42	Fair, bright, and sunny
12	29·80	29·99	29·89	34	43	38	Fair, generally bright. Strong wind at night
13	29·60	29·59	29·61	40	43	40	Rain a.m. and p.m.
14	29·65	29·83	29·63	44	48	42	Rain this afternoon
15	29·69	29·61	29·72	43	45	44	Rain this afternoon
16	29·79	29·80	29·87	45	48	47	Showers. Gloomy all day
17	29·80	29·75	29·67	47	54	50	Rain at night. Gloomy all day
18	29·70	29·78	30·00	47	48	44	Fair and sunny.
19	30·11	30·09	29·90	45	46	44	Fair, but gloomy. Strong wind at night
20	29·82	29·89	30·19	44	47	42	Showers. Gloomy all day
21	30·28	30·32	30·41	47	48	46	Slight showers. Gloomy all day
22	30·29	30·29	30·37	46	47	44	Fair, but gloomy
23	30·16	30·14	30·08	46	48	44	Fair, but gloomy
24	30·03	30·00	29·95	46	50	46	Fair, generally bright
25	29·89	29·85	29·81	43	47	46	Fair, but gloomy
26	29·81	29·80	29·69	49·5	48	40	Drizzling rain a.m. and p.m.
27	29·51	29·48	29·40	46	47	47	Rain a.m. and p.m.
28	—	—	29·52	—	—	40	Heavy rain a.m. and p.m.

Summary.	Mornings.	Noons.	Nights
Highest temperature observed	49·5	54	50
Lowest ditto	29	38·5	36
Mean ditto	41·6	45·8	42·4

Mean of all observations	43·1
Days on which rain fell	11
Fair days	17
Fair days bright...	4
Fair days gloomy	13

The Photographic News, April 12, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Photographers and the Coming International Exhibition—The First Theatre Established in London.

Photographers and the Coming International Exhibition.—The Paris International Exhibition deserves well of photographers—indeed, one of its chief aims may be said to be to benefit disciples of the camera. In the first place, the French Commission intrusted with the direction of affairs have given out that no monopoly whatever will be permitted to any one to take photographs inside the building No doubt, if the direction chose to make money in this way, as has been done before, not hundreds, but thousands of pounds would flow into their coffers. But, in a liberal spirit, they have decided this shall not be, and any photographer who makes proper application, or is willing to bow to the conditions imposed, is to be permitted to photograph to his heart's content within the prescribed hours. We do not know the nature of the restrictions that will be imposed, but it is not at all unlikely, we should think, that the regulations governing camera work will be formed upon those already in existence in Paris and in the national museums, which permit of photographers undertaking pretty well any work of reproduction they desire in the art galleries and museums of the Republic. These regulations have already appeared in these columns, and one of the main conditions, as our readers may remember, is that only dry plates are permitted to be used. It is not at all improbable that in the Exhibition buildings, of which a large portion will be comprised of art galleries, this law will be put into force, and we mention it, therefore, to put our readers on their guard. Many will repair from this country—we know of two gentlemen already who are about to start, if they have not actually done so—and these should make quite sure of being in a position to do work, whatever the restrictions. Mr. William England, one of the gentlemen we refer to, who will, we presume represent, as he has so ably done before, the London Stereocopic Company, will be to the fore in Paris, and it will matter to him obviously very little how or when he will be required to work. He is quite sure to bring back good negatives, whether he employs wet plates or dry, or whatever the limits of time imposed upon him. But others may not be so ready, and these would do well to inform themselves of the conditions to be fulfilled before they pack their apparatus for Paris. That the Exhibition offers a fine harvest to photographers need not be pointed out. If it has been worth while in previous years to bag enormous sums for the privilege of photographing the courts and corridors, enterprising photographers ought certainly to be able to construe the liberty now given them into a profitable transaction, especially as in every case hitherto, in which monopolies have been bought at a heavy price, the buyers have driven exceedingly good bargains. There are two kinds of photographs to be taken, it must be remembered: those for the general public, and those for exhibitors. For the general public, of course, only striking scenes must be chosen—scenes which impress the visitor, and pictures of which, therefore, he would wish to purchase to carry away as souvenirs, or such as would sell in distant cities, where people who cannot go to Paris want to know something of the 1878 Exhibition. All pictures of this kind must obviously be well taken, and from good pictorial photographs. The others taken for exhibitors need not be so perfect from an art point of view, but the chances are, we should think, that they would turn out the more profitable to the photographer. Every exhibitor—or every large exhibitor, at any rate—likes to have a photograph of his "show," more especially if he is a foreigner and the firm or its clients are at a distance from Paris. After the expense of getting up a presentable collection of their goods or manufactures, and arranging them to the best of their power in tasteful array, few exhibitors would hesitate over the expense of having their property photographed *in situ*. In fact, they are, as a rule, only too pleased for the opportunity, and in this way a large amount of photographic work is created, which on the present occasion it will be within the power of any photographer to execute. Here at once we see what a boon photographers are to enjoy at the Paris Exhibition, and we only trust that many in this country will avail themselves of the privileges so liberally accorded. In truth, as we have said, the Exhibition Commission is actually playing into the hands of photographers. The old regulation, we are told, is to be revived, of making every exhibitor and season ticket holder wear his portrait on his sleeve, or, if not exactly on his sleeve, having it affixed to his admission ticket. Our Paris brethren, therefore, will come in for a good deal of small portrait work during the next few weeks, since even on a five franc ticket, to admit for a week, the presence of a portrait of the holder is necessary; and the portrait must be a recent one. Any odd carte-de-visite a ticket-holder may have by him will not do, unless it is still like him in face and features. However, therefore, the public may grumble, photographers have no need to do so, and, in fact, one can well understand that on such occasions, in a cosmopolitan city like Paris, and with people of every nation attending the world's fair, something better than a signature is necessary for identification. A Polish Jew succeeds an Englishman through the barrier, and the latter is perhaps followed by a provincial Frenchman and a Turk. How is the check-taker to know whether the outlandish name and more outlandish writing at the bottom of the ticket is that of the bearer? Obviously, under such conditions, a photographic portrait is the most trustworthy, if not the only test at all available. Our only surprise is, that after the general adoption of the portrait on the ticket in the 1867 Exhibition of Paris, the regulation has not been put into practice more frequently.

The First Theatre Established in London.—London is to lose another of its relics in a few weeks, we are told, so that those who make a custom of securing camera pictures of "Old London" must not be napping. The first theatre established in London, it is said, that of Alleyn, the player, who founded Dulwich College and "God's Gift" Almshouses in St. Luke's, is about to be pulled down. It is situated in Playhouse Yard, St. Luke's, and as the yard is in a direct line of the new street leading to Goswell Road, the Vestry, it appears, insists upon the breaking up of the yard and demolition of the old houses it contains. Alleyn's Theatre is in the centre of the yard, and in a very dilapidated condition; but as it is apparently well authenticated, and there is little doubt, seemingly, that it was the first theatre established in London, a good photograph, if such could be taken, would be profoundly interesting. There are so few landmarks left now, that those in existence are all the more precious to antiquarians and archæologists, and old citizens must have felt many a pang of late years at the disappearance one after another of so many historical reminiscences of "Old London." Just now it is the banks of the Thames below bridge, perhaps more than any other locality, that has been untouched by the hand of Corporations and Boards of Works; in the neighbourhood of Ratcliffe Highway and Wapping Old Stairs there are still picturesque bits to be found for the camera, not the least interesting being some of the old waterside taverns, with balconies and bow-windows going on to the river. A few years, and this antiquated neighbourhood will have been swept away with the rest.

ON THE USE OF ALCOHOL IN GELATINO-BROMIDE EMULSIONS.

BY E. W. FOXLEE.*

At our last meeting I was asked by Mr. J. T. Taylor to elaborate the article "On the Use of Alcohol in the Gelatino-Bromide Process" that I had the honour of contributing to the "British Journal Almanac" for the present year. This I have endeavoured to do. I wish it, however, to be clearly understood that I am not putting myself forward as so old and experienced a worker in the process as many of our members, such as Messrs. Kennett, Taylor, Nesbitt, Wratten, and others; but, having had much experience during the last few years in the use of gelatine for another branch of photography, I may perhaps be able to say sufficient to open a discussion on the subject.

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* Read before the South London Photographic Society.

Now it is impossible to work much with gelatine without being struck with the great difference in the various samples to be found in commerce, no two kinds being alike, and rarely indeed are any two samples even by the same maker identical. Some will require as much as fifty per cent. more chrome alum to bring about insolubility, while others, again, will become absolutely insoluble upon being treated with bichromate of potash or ammonia. So variable, indeed, are the reactions of this material with the salts of chromium, that it is now the practice at the Autotype Company's works to submit each fresh supply to a chemical examination before taking it into use, so that it may be modified to suit the different purposes to which it may be applied.

Happily the gelatino-bromide emulsion worker is exempt from these perplexing reactions, as all he requires is that the gelatine should be of good quality *as* gelatine, and free from any impurity likely to act on the silver bromide. These conditions may be relied upon in Messrs. Nelson, Dale, and Co.'s photographic gelatines, and also in their opaque gelatine, one or other of which, I believe, is generally employed in this process. We all know that gelatine in a dry state will keep for any length of time free from decomposition, as witness the glue joints of old furniture, violins, &c., many of which are as sound now as they were when first made a century or more ago. And we must all admit the judgment and ingenuity of Mr. Kennett when he introduced his pellicle in the dried form, the keeping quality of which is now beyond question.

Although gelatine will keep indefinitely in its dried state, it is quite the reverse when in a jellied form—in fact, I scarcely know a substance so liable to decomposition as this. The more aqueous to solution the more liable is it to decomposition. The manufacturers even tell us that, if a thunderstorm occur during the time a batch is in a heated or fluid condition, it generally sets up decomposition or putrefaction, which renders it useless as a first-class gelatine. This has been borne out in my own practice; for, during the autumn of last year, when I was daily preparing between two and three hundred-weight of jelly for tissue making, I was surprised on one occasion to find that a batch had become decomposed, showing beads of gas studded throughout its bulk, although some prepared in precisely the same manner some days before and some after were quite perfect, all being from the same batch of gelatine, the only difference being that during the time it was in a fluid state a rather severe thunder storm passed over the neighbourhood. When this decomposition is set up in it the only course to adopt is to throw it away; for, if it be used for any purpose in photography, it is sure to bring trouble to the operator.

Although Mr. Kennett's pellicle is very convenient, still an emulsion that will keep for a reasonable time in the jellied form, so as only to require warming when a few plates are required, is a desideratum; and to secure this end various antiseptics have been suggested, such as carbolic acid, salicylic acid, and also various essential oils, such as oil of cloves, &c. Carbolic acid will, undoubtedly, prevent putrefaction if added in sufficient quantity; and I am not aware that *pure* carbolic acid will exercise any deleterious effect on the silver bromide. Salicylic acid I have not tried, but its price is, I think, a great bar to its use. The essential oils few, I believe, will care to use, owing to the reducing action most of them have on the salts of silver. The antiseptic I am about to advocate is alcohol (methylated will do), which prevents decomposition of gelatine—I had almost said indefinitely, but I have not tested it to *that* extent. Here, however, is a bottle of solution containing about one-fourth its bulk of alcohol, which has been made over eight years, and you will see that it is quite as good now as when first prepared.

Not only does the alcohol act as an antiseptic, and has no action on the silver bromide, but it assists in other ways, causing the emulsion to flow more freely over the plate like collodion, and to set quicker, and also to dry in much less time than when water alone is the solvent. The quantity that may be added depends very much on the kind of gelatine used. *This* flask contains one part of gelatine to three of water and three of spirit; you will notice by its opalescent appearance that part of the gelatine is precipitated. *This* flask has one part of gelatine to four of water and two of spirit, and is only slightly precipitated. If either of these samples be liquefied the solution will be transparent, and a plate coated with it will become opalescent as soon as the gelatine has set; but it will be quite transparent when dry. Here is a plate coated from the flask containing the larger proportion of alcohol, which shows that a large proportion of spirit may be added without injury.

I may here remind the members that the more frequently a solution of gelatine is heated and the longer it is kept in a fluid state the sooner it loses its property of gelatinising or setting, so that I advise that the stock of emulsion should be kept in several small bottles in preference to one large one, so as to avoid having to melt the whole bulk each time that a few plates are required. And for this reason I should avoid the elimination of the haloid salts by dialysis whilst the emulsion is in a fluid state; but I think that few will require this advice after seeing Mr. Wratten's very simple method of effecting this, as shown by him at our last meeting.

There is another use to which alcohol may be put in this process, namely, in abstracting the water from the plate so as to allow of its being dried by heat; for if after the gelatine has set, the plate be immersed in alcohol for a minute or two, it may be placed on a hot-water bath without fear of its running off the plate, seeing that gelatine is insoluble in strong alcohol. By this means I have coated a plate, dried it, printed a transparency, developed, fixed, and again dried it, in little over a quarter of an hour.

For coating the plate I always use a Crooke's albumen pourer, which I cannot too strongly recommend for the purpose, as not only is the emulsion filtered immediately before pouring on the plate, but the air-bubbles—always so troublesome in gelatinous solutions—are prevented from getting on to the plate. Of course the instrument must be placed in a vessel of warm water when in use.

At the last meeting one of our members raised the question of the inequality of the film if the plate were not perfectly flat. This was disposed of by Mr. Kennett, as far as fairly flat plates are concerned, but not in the case of curved ones, such as those used in the late Mr. Sutton's panoramic camera. Such plates, I find, may easily be coated with gelatine emulsion by adopting the plan employed in coating albumen plates, namely, to first coat the plate with a porous collodion, and, after washing out the ether and alcohol, to pour on the emulsion and allow it to soak well into the film. It is not then necessary to place it horizontally to set, but it may be reared on end to dry. This will be found very advantageous in exceedingly hot weather. Of course the plate should be rinsed with warm water to slightly heat it before applying the emulsion.

LANDSCAPE WORK AND ITS RELATION TO ART

BY PAYNE JENNINGS.*

In noting down a few thoughts in connection with landscape photography, I do so with the hope of encouraging my brother workers in the same field to aim at the highest possible excellence, and to always go forward with the work, so that, ultimately, we shall compel even the most obstinate enemies of photography to admit that she *has* art claims, and will *assert* them; that no matter *what* the means, the result must be looked at as the production of the *mind*. What we want is not *technical* but *art* education, and this, I maintain, we must use all our energies to develop. We have, alas! too few eminent artists either in portraiture or landscape; but I am sure you will agree with me in saying that the works of all these men will be found to be stamped with an individuality which it will be found impossible to deny, showing clearly that the brain has been at work in a predominant degree, and that lenses, cameras, and other materials have only been as brushes and colours are to the painter. I do not mean to convey that we should not take care to provide ourselves with good materials—the best we can get, by all means. Will you not find the painter equally careful that his brushes are of the required quality, and his colours possess the necessary purity? But all these are eminently subservient to the brain, which conceives the work, and are only as a means to carry it out. It does not matter to an artist what collodion or other matter he uses, so that it be good; it will not influence the result. It may give him a little more trouble in some cases, but the effect will be the same; he has made up his mind to produce a certain result, and he will *do* it.

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* Read before the Edinburgh Photographic Society.

Suppose, for the sake of illustration, that two or three photographers are requested to make a negative, the subject being a cottage, immediately at the back of which is a hill. They are to treat the subject *pictorially*, and are left to themselves as to the means they shall employ. We will take it for granted that, technically speaking, they are all equal.

Photographer No. 1 will probably go to the place, and it being a fine clear day, and wind steady—the sun, we may add, is shining almost vertically on the scene—he will immediately conclude that nothing could be more fovourable; he "will show every stone in the cottage, and, for that matter, every stone on the hill, too, if there be any." The camera is arranged, best lens fitted and carefully stopped down to give extreme sharpness, the plate is exposed and developed, and "Oh, joy! the negative is a beauty—sharp as a needle; let them beat that if they can."

Photographer No. 2 will go about his work after another fashion; *he* will turn out something different to that other fellow. He has been told that it is best to have the light strike the subject at an angle of about forty-five degrees, and he selects the time of day accordingly. It is true the image on the ground glass does not strike him as being particularly beautiful; but has he not gone strictly according to his instructions? *He* will not have the cottage in the centre of the plate, as No. 1 has shown it; but, still following his instructions, he puts the principal object to the right or left. He must now have a foreground to complete matters, and what could be better than Mr. and Mrs. Rustic, the occupiers of the building, who are straightway induced to "stand as if they are talking to each other?" He has been told that figures *judiciously* introduced are a great help, and "what could be more natural than this arrangement?" The figures look toward each other as if they were striving to stare each other out of countenance; however, the instructions have been strictly adhered to, and so all *must* be right. The negative is taken, and although the result, in comparison with No. 1, is very different, still, judged pictorially, they are about equal.

Photographer No. 3, whom we will suppose to be an artist of cultivated taste and feeling, goes to look at the cottage; but Gentlemen Nos. 1 and 2 chuckle as they see him going, for how can he improve upon their productions? Arrived at the spot, the artist is disappointed—the ugliest portion of the cottage is in strong sunlight; and he feels that he is helpless to produce a picture under that condition. He considers the subject, and calculates that in the very early morning the opposite, and very picturesque, gable will receive the light, and he determines to be up betimes to see the effect, and seize it if it be satisfactory. The next morning is fine, but hazy; however, he does not mind the haze. Perhaps he says to himself, as he is dressing: "The effect will be prettier, as it will throw the cottage into bolder relief, and assist photography in separating it from the adjoining hill." Arrived at the scene, he is charmed beyond measure at his little cottage in its new garb. The sun, as he predicted, though shining faintly, is tipping the gable he so much admired. The housewife, just up, is evidently starting the fire, as the smoke is lazily pouring from the chimney; the hill behind is slightly obscured by the haze, but looms up grandly, and the picture is complete. And now to make the most of it no time is to be lost, as the effect may soon be gone. Care is taken to have the smoke from the chimney relieved by the dark fir which is near to it, and the camera is moved up as near as possible to the creepers which hang over the wall in front; no other foreground is required. He asks permission to have the rustic door partly open, as he is greatly in want of a little intense shadow. And now a last look at the ground glass. He breaks away a twig that will not come into focus, but pokes itself provokingly in front of that cluster of roses. "Ah! what is that?" A gleam of light of greater intensity now steals across the screen—not altering the effect, but heightening it, the sun seeming to say, "Well done, old fellow! I'll help you; but come on now quickly with your plate, or I may not be able to keep it up." The negative is taken and developed, and I tell you that man carried home a picture; he carried home a result produced by true art feeling and careful study. He saw a beautiful effect, and his artistic mind grasped it at once, and determined him to secure it. Had the early morning effect not pleased him, he would have secured it under some other aspect; but you may rest assured he would have made a *picture* of it—nothing else would satisfy him. He had become accustomed to work up to a certain standard, and he could not go below it.

I am sorry the limited time at my disposal will not allow me to enter more fully into this subject; but I shall be amply repaid for the little trouble I have taken in writing this short paper should it be the means of increasing the love which I am sure all of you have for our beautiful art.

I have sent for your inspection a few of my studies of English and Irish scenery, which may be of interest to you. I have also forwarded a few smaller views which require some explanation. I have been commissioned to illustrate several of the poets with photographs from nature, and my people are at present busily engaged in printing four or five thousand of these little views. Nos. 1 to 18 are specimens of these studies. I send you them because I know the interest we all have in looking at actual productions; and I know no better means of advancing our art and mutually improving ourselves than the system of exhibiting the results of our labours, so that we may see where we are at fault, and where improvement is needed. We can all learn something, and should not be ashamed to do so even from the humblest of our brethren.

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REMARKS ON DR. MONCKHOVEN'S PAPER.

BY W. S. BIRD.[*]

In commenting on the paper contributed to our last meeting by Dr. Monckhoven, one may for the present dismiss the question of the suppression of bichromates in carbon printing, and proceed to his suggestions for a more perfect fixation of the pigment image, and the introduction of ferric oxide as a brilliant pigment absolutely inalterable by the the solar rays.

Before doing so, I wish to express a certain diffidence that I experience, due to the fact that, being commercially interested in all that pertains to carbon printing, I stand before a Society like this, not only with the fear of being credited with "talking shop," but with the dread that the bias of a trade interest may really obscure the judgment and indispose me for the judicial investigation of a new fact. I shall endeavour to avoid any such bias as far as possible, and I feel my position somewhat easier in the present case, as the author of the paper which is to be considered, is not only a distinguished *savant*, but has thrown his resources and energy into the manufacture of carbon tissue as a trade. You therefore, gentlemen, outside the disturbing influences of any commercial rivalry, may maintain evenly-balanced minds, and can discount, to any extent found desirable, the statements put before you. In the paper to be considered, it is evident that Dr. Monckhoven comes before the Photographic Society of Great Britain, not as a manufacturer, but as a *savant*; that, as such, he prefers the honourable reputation of the discoverer to the profits of the patentee, and, therefore, places the results of his chemical researches freely before the public. This Society cannot but feel honoured to be the recipient of original papers offered in such a spirit.

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[*] Read before the Photographic Society of Great Britain.

This premised, I feel bound to object to the first part of the title of the paper, "On the Fading of Carbon Prints," as unwarranted by facts, and consequently misleading. The experiments detailed, and the arguments adduced by Dr. Monckhoven are intended to prove that in the ordinary production of a pigment print the bichromate of potash is not fully deoxidised, that the print leaves the alum bath with a tinge of yellow, which, upon after-exposure for a considerable time to the direct solar rays, changes to a greenish hue; with this change of colour the chromic salt present in the pigmented film has reached the stage of sesqui-oxide of chromium, when any further change is not to be apprehended.

Ignoring experience, and, for the sake of argument, granting all this to be true, this is not fading of the picture; at the worst, it is only an alteration of tint, one that does not disturb the relation of light and shade, or impair those subtle half-tones on which its photographic excellence depends. To say that carbon prints fade in the sense with which we apply that term to their silver prototypes, is to belie common experience and the whole history of the process. Such an assertion is sufficiently contradicted by the myriads of prints spread over Europe the last ten years by the indefatigable enterprise of the late Adolphe Braun. Judged by the practical experience of fourteen years, one may fairly say that carbon printing has removed the one reproach of the photographic art—the fugitive nature of its beauty. From my own experience in dealing with large numbers of pigment pictures, and my position as a natural recipient for complaints of fading, if such existed, I can honestly declare (postulating the avoidance of known fugitive colours in the tissue, and proper care in the production of the prints) my belief to be that, for all the purposes of use and ornament to which they can be applied, carbon pictures are absolutely permanent.

If, for the ends of use and beauty, it were essential to expose photographic pictures for months to the direct rays of the sun, my conviction might possibly have to be modified to the extent indicated by Dr. Monckhoven, namely, that a yellow tint not discernible by ordinary vision when the print is produced, changes to an almost equally invisible green after long exposure to sunlight.

I have made an extensive search through a long variety of prints in various colours to discover any traces of that congenital yellow predicated by Dr. Monckhoven. I place a series of such pictures before the Society this evening. As you may observe in many cases, the half-tones denote an incredibly thin film of the pigmented gelatine, and in others the high lights are denoted principally by the white surface of the paper support, where, if visible at all, the yellowness of the chromic salt should be discernible. Upon the walls you will see examples of duplicate and similar prints in frames that have been subjected to abundant daylight in a lofty gallery with glass roof for from three to eight years. These prints are the productions of Braun, and of the Autotype Company. The loose prints are from stock kept in portfolios, or drawers, and can be compared with those in frames after years of daylight.

I do not produce these specimens and make these statements as arguments against the theory advanced by Dr. Monckhoven of the changes produced by light on the chromic salt, but rather to show that the "Fading of Carbon Prints" is not a judicious title for the paper, and is calculated to convey an erroneous impression as to their real and relative permanency. The so-called "fading," if it exists at all, is only a minute change of *nuance* in these pictures, and that change can only be expected under conditions of exposure to light which, in the sane conduct of human affairs, do not usually occur.

With regard to this theory of imperfect oxidization of the chromic salt in the ordinary process of carbon printing, the experiments detailed are interesting, and may probably suggest a method of perfect fixation. While contending that experience proves that carbon prints, after ten years' exposure to the ordinary influences of light and atmosphere, are as perfect as on the day of their production, I will cheerfully admit that any new light thrown upon the chemical changes involved, and affording the means to insure more perfect stability, is a boon to be thankfully acknowledged. Although roasting our photographs in the sun is not a human need at present, yet the knowledge that they will pass triumphantly through such an ordeal renders our interest in them more secure.

The experiment of immersing a sheet of plain paper in the bichromate bath, exposing to light, washing in boiling water, and fixing with alum, is not by itself conclusive. The bichromate penetrates the fibrous nature of the paper more intimately than it does the pigmented film of gelatine, the paper does not supply the same organifier, and is less accessible to the impact of the light—the experiment is not parallel with the production of a pigmented print, and might be dismissed had not Dr. Monckhoven, since the presentation of the paper to the Society, published an experiment more to the purpose. He prepares a gelatine film with sulphate of baryta, exposes to light, develops on a glass plate, and finds the resultant colour to be yellowish and convertible into green by continued insolation. This is an experiment largely supporting the Doctor's theory of the chemical changes involved, and of the value of his suggestion to add to the alum bath a proportion of bisulphite of lime. If no drawbacks shall be found to the employment of the lime, the comfort of a theoretical security will be added to the practical immunity from change enjoyed.

(To be continued.)

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

The treatise, of which the following is an abstract, obtained the gold medal and money prize, of the combined value of 140 ducats, awarded by the Photographic Society of Vienna. It is pronounced by the judges to be distinguished no less by the author's thorough study of the literature bearing on the subject, than by the accuracy of his experiments on the reactions of the chromates on gelatine and the allied substances.

After alluding to the importance of the subject, both to the chemist and the photographer, the author describes the nature of his researches into the chemical nature of the reactions which he had proposed to study, and the experiments by which he had demonstrated them. He enumerates the friends and distinguished men to whom he acknowledges a debt of gratitude to be due for the assistance they have rendered him in his work, and then proceeds to deal with the question of the action of the chromium acids and their salts upon gelatine, albumen, gum, sugar, &c., under the influence of light.

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* *Photographische Correspondenz.*

That the chromates, when in combination with a variety of organic substances, are capable of being reduced only by the action of light, is a phenomenon of the first importance to photography. Using as differences the parts which the various reactions play in the formation of the photographic image, we find that the methods of obtaining a picture by means of the chromates divide themselves into groups.

To the first group belong those in which the decomposed chromate itself forms the drawing. Pouton was the first to obtain a negative of this kind by exposing a drawing beneath paper steeped in potassium bichromate. The picture produced has a faint yellowish brown tint, and consists of chromium chromate; the ash of the paper after ignition contains chromium oxide. The nature of the decomposition which takes place will best be understood by a consideration of the following reactions:—The chromium chromate is formed as a brown powder of great instability when chromic acid is deoxidized by sulphurous acid, or when the acid is heated, either alone or with chromium oxide, or it is precipitated from chrome alum with potassium chromate. It is decomposed into chromic acid and chromic oxide by alkalies and acids; even long-continued washing in distilled water will gradually but completely remove the chromic acid, leaving the chromium acid behind, and the use of spring water containing lime accelerates the separation.

The pale chromium pictures can be more intensely coloured by the use of different substances. Salts of lead, silver, and mercury give a dark yellow colour, and, for many colouring materials (as, for example, alizarine, Campeachy wood, or fustic), chromium chromate will act as a mordant. Copper bichromate gives more highly-coloured pictures on paper than potassium bichromate, because they are formed by a mixture of chromium chromate and basic copper chromate. The presence of the latter is explained by the partial decomposition of the chromic acid by light, forming the insoluble basic copper salt. These copper chromate pictures can be coloured red-brown by potassium ferricyanide. Nickel bichromate will behave in a similar way. Willis's anilin printing process, improved by Vogel, comes into the same category.

The second group of photographic methods above alluded to is of much greater importance. They are founded on the property of the chromates to render insoluble, or to essentially alter, certain organic substances under the action of light, so that the picture no longer consists of the chromium oxide, but is impressed on the organic substance which has been so modified. In what way the chromates act on the organic bodies, how the organic substance when altered by the action of light is constituted, and how far the chromium oxide has an influence on the formation of the photographic image, are questions of theory which the observations hitherto made are not qualified to settle. The author has attempted to solve them by the study of the action of re-agents and of light on the different organic bodies employed in this branch of the photographic art.

Gelatine being the most important of these substances to the photographer, the author treats at some length of its peculiarities and properties. Under the name of gelatine are to be understood the finer kinds of glue. Glue consists of two substances—glutin (obtained from leather, parchment, bones, &c.) and chondrin (from the cartilges of the ribs and joints)—and its properties vary considerably, according as one or the other of these predominates. Photographic gelatines contain principally glutin, and very few are found by the author to be rich in chondrin. Although these two substances are much alike in properties and appearance, it is found that alum, lead acetate, iron sulphate, chrome alum, and acetic acid precipitate chondrin only, and not glutin. In this reaction we possess a means of distinguishing a gelatine rich in chondrin from one in which glutin preponderates. A ten per cent. solution of gelatine is prepared in hot water, and mixed with a concentrated solution of chrome alum. When the proportion of chondrin is large, the gelatine will set while still hot, so that the test-glass in which the experiment has been made can be turned upside down without any of the contents running out.

Gelatine is a highly hygroscopic substance, and when dried at ordinary temperatures contains from 15 to 20 per cent. of water, which can only be driven off at 120° C. In cold water it swells up to an elastic transparent mass of about six to eight times its original volume. The amount of water which it will take up depends a great deal on its quality. Generally, good photographic gelatine absorbs from five to ten times its weight of water. Water of from 2° to 5° C. is taken up much more slowly, and on this account several authorities recommend cooling the chromate bath with ice, when the temperature of the air is so high as to produce, while sensitizing, an excessive swelling of the gelatine.

In hot water gelatine is more soluble, especially when beforehand it has been allowed to soak in water, for it will have absorbed as much water as will dissolve it, if it be heated on a water bath to from 30° to 35° C. The better quality of gelatine, and that most adapted for photography, may be saturated with water and heated to 30° C. without dissolving, while inferior kinds dissolve at 20° C. The lowest quality will withstand a temperature of from 60° to 100° without dissolving, but it is quite unfit for photographic purposes.

The phenomena are of importance to photographers because, if paper be coated with a liquefiable gelatine, the latter will melt and run off when the temperature is raised, while a good gelatine will withstand the heat; but, from the melting points above stated, it will be seen that even a superior quality of gelatine may not be heated above 25° C. A film of gelatine soaked with liquid may be relieved of its superabundant water by pressure, and hence many operators squeeze out the chromate bath from the sensitized pigment paper, in order that it may be able to stand a higher temperature in the drying-room.

The author found that a solution of certain kinds of gelatine of only 5 to 8 per cent. will set when cold, but that a concentrated solution will set much quicker than a weak one. This becomes of consequence in coating paper or plates with gelatine, and then drying when the latter is set. In photography, it may be recommended, as a fixed rule, to dissolve the gelatine in as much water as it will absorb when dry.

Long boiling in water deprives gelatine, to a great extent, of its power of setting. After it has been boiled for many hours it does not yield so firm a jelly, melts at a lower temperature, and dissolves more quickly in water. On this account, such a gelatine cannot be employed in the carbon processes; in fact, Blair recommends that the gelatine should never be raised to boiling point, and should not even be kept in a melted condition for a longer time than is absolutely necessary. For the Woodbury and photo-galvanic processes, the author maintains that a gelatine which melts at a low temperature is of greater service than one more difficult to render fluid. Gelatine which has been altered by long boiling has a constant composition, which is probably that of four molecules glutin to one molecule water. The addition of acetic acid, of weak nitric acid, and of zinc chloride, also prevents the setting of concentrated gelatine solutions; a solution of gelatine coagulated by acetic acid is therefore useless in the carbon processes, because it will flow off from the substratum.

(To be continued.)

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THE BEST DRY PLATE PROCESS.

The hope of reward is, without doubt, one of the keenest incentives to effort of any kind which can be brought to bear upon humanity. The reward may take various forms: fame, love, money; the approbation of the many, or of one; or the possession of property. A writer in the *Scientific American* recently pointed out that amongst a people distinguished for intelligence and industry (the Swiss) there was no inventive ability, because there was no patent law to protect property in inventions. The proper motive for stimulating the inventive faculty was wanting, the chance of reward being too remote and insufficient to stimulate effort. The offer of a monetary prize often exercises a specially beneficial incentive to exertion, as such an offer possesses both absolute pecuniary value and honour as well. We cannot doubt that Mr. Paget's generous offer of £50 for a dry process to supply the reasonable conditions which may render it of value to the tourist and traveller will prove of great value to photographers generally.

It may be said that there are many good dry processes already in existence; so indeed there are, but none, it seems, certainly possessing certain characteristics which Mr. Paget regards as of vital importance: primarily, keeping powers after, as well as before, exposure. At any rate, there are none possessing the authority of success in a competitive examination. The first qualification mentioned is a very satisfactory one. The committee will demand excellence as of the first importance. The results must be as good as those produced by the wet process. Such a degree of excellence has been obtained in dry plate work, but we are uncertain whether such results, when produced, are most fairly attributable to the process or the photographer, as in all cases where this excellence has been attained it has been by a manipulator of such rare skill, taste, and carefulness, that we may, without risk of invidiousness, name the men: the names of R. Manners Gordon and Henry Cooper will spring to the memory of every dry plate worker. Col. Stuart Wortley has also produced dry plate negatives undistinguishable from wet, and years ago Mr. Mudd produced work of a similar character. Mr. J. H. Whitehouse has also sent us many prints from coffee plates, quite equalling wet plate work. Here we have almost as many different processes as experiments, each giving results equal to those of wet plates. Gum-gallic, emulsion, collodio-albumen, and coffee, are represented in the names we have mentioned. Excellence is not difficult to obtain, then, with known dry processes. The next quality of vital importance may probably be found more difficult to secure. Collodio-albumen plates have, it is true, been found to keep well, and, with a final wash of gallic acid, they have been alleged to possess indefinite keeping qualities. The keeping qualities before exposure are, beyond a question, very satisfactory, but whether after exposure the plates may equally well be kept is a matter not so satisfactorily attested. For the purposes of the traveller, who may be without facilities for development for months, it is of vital importance that these keeping qualities should be secured. There are many plates which will keep well before exposure, but in which the latent image impressed gradually grows feebler and feebler during all the time which elapses between exposure and development. Mr. Paget's conditions require four months keeping qualities before exposure, and three months after exposure, without deterioration.

The conditions, it will be generally admitted, are not in any way unreasonble. Great rapidity or great simplicity is not demanded; but if there be several competitors satisfying the primary conditions, then great simplicity and great sensitiveness will be considered as elements of merit. As a rule, great sensitiveness has been considered incompatible with long keeping qualities, as extreme sensitiveness implies facility of change. But as it is probable that the competition may lead to the re-examination and formulating of processes worked by many, their publication may be of as great service to the community as the publication of the prize process.

The revival of old processes, with the advantage of modern experience, has often proved valuable in photography. Many of the old dry processes were slow because of the absence of the energetic developer used now with dry plates. The free use of bromides and of alkaline developers may be said to have revolutionized dry-plate photography, and some of the oldest processes, with such modifications as recent experience may suggest, may be found to be, after all, the most satisfactory. We strongly recommend experimental competitors to make research in this direction.

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FRENCH CORRESPONDENCE.

French Photographic Society—Prize Travelling Photographic Apparatus—Poitevin's Carbon Process—New Instantaneous Process—Apparatus for Washing Prints—Gelatine Pellicles.

The monthly meeting of the *Societe de Photographie* was held on Friday last, the 5th of April. In the month of January, 1877, the Society offered a prize of five hundred francs to the maker of photographic apparatus best suited to the purposes of travellers and tourists. The prize was to be awarded for the apparatus which best fulfilled the conditions of simplicity, lightness, and portability, without sacrificing any contrivance which increased its utility as a photographic instrument. Only four competitors presented themselves, three of whom were MM. Jonte, Roger, and Wils. The name of the fourth it is unnecessary to mention, as the apparatus which he submitted was so far from complying with the requirements as to render him practically *hors de concours*. The committee appointed to decide on the merits of the articles offered for competition, while recognising numerous advantages in each of the three instruments, were of opinion that each possessed also some inconvenient arrangements, which they have enumerated in their report. They were, therefore, unable to adjudge the prize; they felt, however, that every one of the three competitors deserved some recognition of his attempts and partial success, and they have, in consequence, awarded a medal of two hundred francs value to M. Jonte, one of like value to M. Roger, and a third of the value of one hundred francs to M. Wils. In this way the sum of five hundred francs, originally offered as sole prize, has been distributed among three competitors, and the Minister of Public Instruction will be asked to make a further grant of the same amount to be awarded as a prize for the same object at another competition, and which will remain open till the end of the year. As foreigners, as well as Frenchmen, will be admitted to this competition, I am glad to have the opportunity of bringing it to the notice of the readers of the Photographic News.

M. Poitevin, who for some years appears to have withdrawn himself from the photographic world, has again returned to the field of research and experiment in the science where he at one time obtained such renown and success. At the meeting of the 5th of April he made a very interesting communication on a subject on which he had already given us some information. It relates to a property of gelatine, rendered insoluble by heating with iron perchloride and tartaric acid, of becoming again soluble after a sufficiently long exposure under a photographic negative. He has also experimented on and proved the possibility of obtaining a print in fatty ink on polished glass coated only with a dry film of iron perchloride and tartaric acid, or on gelatine previously rendered insoluble, the ink adhering only to those parts which have not been insolated. The solvent penetrates from the surface inwards, and by adding an inert or grainy substance to the gelatine, the required kind of grain for impressing ink or soft metal plates is easily obtained.

M. Poitevin avails himself of the newly-discovered property of gelatine films which have been rendered insoluble by perchloride of iron and tartaric acid to obtain directly from a negative, by means of a fatty ink, positive prints which can either be transferred to a lithographic stone, or to a zinc plate, from which an impression can be taken by the printing-press, or which can be rendered in relief by the recognized methods of typography. This property consists in the fact that gelatine made insoluble by iron perchloride and tartaric acid, and not again rendered soluble by exposure to light beneath a photographic negative, will once more become exceedingly soluble in warm and slightly acid water, either after the image has been developed, or when it has been previously treated with a weak solution of hydrochloric acid.

The process adopted by M. Poitevin for producing, in this novel way, pictures in fatty ink, is as follows:—The paper is coated on one side only with gelatine, slightly coloured in order that the progress of the operation may be the better observed, and floated with both sides successively on a bath prepared by dissolving—

Iron perchloride	10 parts
Tartaric acid	3 ,,
Water	100 ,,

Or the paper may be dipped entirely in the bath for some minutes. It is then hung up by one corner in the dark to dry. When it is dry, it is exposed to the sunlight under a negative of which a print is to be reproduced. The printed film is next treated with warm water, which dissolves out all the parts that have been affected by light; thus is obtained a reversed negative print of the object, since all the transparent parts of the negative are represented on it by the white of the paper, where it has been bared of gelatine. By means of a roller, or of a pad, or, still better, of the press, the surface of this print is then coated with a film of ink, and plunged in water slightly acidulated; it can also be next treated with acid water, which dissolves the gelatine where it still remains on the white parts, while that which is in direct contact with the paper remains adherent to it, and forms a positive picture in fatty ink which can be transferred to the stone or the zinc. M. Boivin, M. Poitevin's fellow-worker, in experimenting with this new process, has obtained by its means excellent results, some of which I have seen; it seems probable that it will be successfully worked.

M. Penne, an Algerian photographer, but just now resident in Paris, communicated to the Society the discovery of a new process to which he has given the name of *Francais-extra-rapide*, by means of which, as he maintains he can take a perfectly instantaneous photograph. Th nventor did not describe his process, but he offered to demonstrate it to those of his colleagues who should be willing to examine and compare the experiments which he proposes to carry out next Sunday at the atelier of M. Franck, and the succeeding Sunday at that of M. Walery. It is probable that a large number of persons will accept this invitation, and I shall not fail in my next letter to give an account of the results.

A photographer of Reims, M. Couture, exhibited to the Society a most ingenious and simple apparatus for washing positive silver prints. It is composed of a zinc trough with a double bottom, and of a reservoir placed above it. The water falls from the latter through a tube terminating in a moveable nozzle in the form of a cross, and pierced with holes. The water escapes from these holes in small jets, causes the nozzle to turn round rapidly, so that while the surface of the liquid in the bath is thoroughly stirred up, it is, at the same time, put into rapid circular motion.

M. Stebbing submitted to the meeting leaves of gelatine to be used instead of glass plates for taking negatives. As in the carbon process, printed films taken on glass can be transferred to these leaves by simple contact; they can either be inverted, or acted on directly by coating them with emulsion. Ernest Lacan.

THE DRY PLATE COMPETITION.

The following are the conditions prepared by a committee of the Photographic Society, consisting of Messrs. W. England, Sebastian Davis, and Wm. Bedford, and sanctioned by Mr. Paget, the donor of the prize, for the guidance of competitors for the prize of £50 offered for the best dry plate process:—

"1. The description of each process accepted in competition shall contain sufficiently accurate details to enable any ordinarily skilful photographer to produce results thereby equal to those obtainable by the wet collodion process.

"2. Sensitive films made by the process shall remain without perceptible change for not less than four months after preparation, and must keep satisfactorily three months in any climate between exposure and development. Should more processes than one fulfil the stated conditions, the preference will be given to the most sensitive and easily prepared.

"3. Each competitor or his representative shall have the option and be willing, if required, to prepare any special chemicals or appliances, and with such, or others prepared according to his formulæ, make, expose, and develop some negatives by his process, in the presence of the appointed judges.

"4. A description of the processes shall be sent to the secretary of an award committee, to be appointed by the Council of the Photographic Society of Great Britain (competitors not being eligible to act thereon), on or before the 31st March, 1879, accompanied with three 8½ by 6½ unexposed plates, and two or more finished negatives. Should the negatives not be equal in the opinion of the judges to those produced by the wet collodion process, they, together with the unexposed films, and descriptions of the means by which they have been produced, will be returned on or before the last day of May, 1879. Competitors may send the negatives, &c., accompanied with their names and addresses enclosed in a sealed envelope, and marked outside with a cipher and an address, which will be returned unopened should the award committee consider the specimen negatives below the requisite standard of excellence. One or more of the negatives by the successful process shall be retained for exhibition until after the next meeting of the Society.

"5. The decision of the committee appointed by the Council of the Photographic Society shall be accepted by the competitors as final, and the receipt of the prize shall be deemed equivalent to an agreement that the process may afterwards be published unconditionally, practised by any one. Should the conditions not be entirely realised, the prize may be either awarded or retained for competition during the following year, at the discretion of the judges. After the award the description of the prize and other processes may be published under the direction of the judges, unless a wish be expressed to the contrary at the time of sending in a process for competition, should it not prove the successful one."

THE SUPPRESSION OF NEGATIVE RETOUCHING.

BY P. PIQUEPE.*

It has very often been attempted to suppress the retouching of photographic negatives, and substitute for it one or several mechanical processes which have been lately much spoken about. I quite agree that success in that way would be of considerable importance, this fact being well known: that the result of mechanical operations is at all times more perfect and easier to obtain than it is possible with the help alone of even the most skilful hand. Where, for instance, is the painter so clever in his art who could produce with such exquisite fineness of details, and delicacy of half-tones, the foliage of trees, and the structure of flowers, as is so easily and perfectly done with our photographic lenses? What is true for the painter is also true for the retoucher, and it is quite right to think of suppressing the manual retouching if a previous mechanical operation can be substituted for it, by which more satisfactory results will be obtained, as we must confess that, in certain cases, the cleverest retouching is unable to give the necessary softness chiefly considering the sharpness of the pictures printed in carbon or fatty inks.

However, although the necessity for such an improvement is generally acknowledged, the work continues to be the same, and the reason is that, among the different methods proposed, not one is practical, as the results are always foggy or out-of-focus negatives, which require the same amount of retouching, the defects of the face, such as spots or freckles, being always apparent; and, besides, the negatives themselves being faulty, will print worthless pictures.

For my own part, the most simple and reasonable plan would be not to act in such a manner as to compromise the fineness and transparency of the plate—qualities that one must, on the contrary, endeavour to obtain as perfect as possible—but simply to suitably prepare beforehand the subject intended to be reproduced. Formerly, before retouching the negatives (as now practised) was known, every print had to be submitted to a careful retouching, but it was soon understood how a gain of time and labour would be effected by putting all the work on the negative. Fortunate idea—method at present generally adopted.

Why, then, would it not be as practical, instead of working the face on the negative, to previously prepare the face of the sitter himself? The negative would be thus obtained without any defects, with a greater uniformity—in a word, perfect in the camera itself—by only one operation. This observation is based upon a recognized fact: the softness and admirable modelling of negatives taken from marble, wax, or plaster statues. No retouching could improve them, no pencil could rival their perfect evenness. Every one, also, is aware that actors lay colours on their faces before they appear on the stage, for how beautiful soever their natural complexion, it would, with the dazzling clearness of the light, seem pale and yellowish; besides, if they be taken by photography, their faces, although looking plastered, will come out very even on the negative, which will require *very little* retouching. Therefore, in my opinion, the method adopted by actors for braving the lights is favourable to our operations, as it allows us to soften our effects and deceive the acute sight of our lenses, too deep sometimes to the tastes of our sitters.

To give to the surface of the human face the evenness and softness of the statues, would be the method. Thence no more alterations in the likeness, a fault which is the reproach of the usual process, and very prevalent. The expression remains the same, same lines, same wrinkles, everything is *softened*, not *eliminated*; no risk of destroying the lighting; the result is sure, quick perfect. But supposing, by the fault of the operator, perfection be not attained (the cause would be a too strong or hard light), the usual process, remaining the same, is always ready to use; indispensable, indeed, in certain exceptional cases of a line to be put straight in nose or mouth, &c., alterations which, although very simple, are only possible to effect afterwards.

Now special preparations would be indispensable, and they can be found very easily. The rice powder used a long while ago for covering hair so red that it comes out too dark, would not fulfil the purpose, as it is applied with difficulty when the face is dry; if wet, it forms large thick patches, which would look like stains on the negative. I would not, of course, advise the use of pomatum or paste, as many sitters would decline to grease their faces with it; besides, the result would not be good, as the bright light on the prominent portions would come out too hard. The best preparation would be an opaque liquid, containing in suspension an impalpable powder, which ought to be evenly distributed on the skin with a sponge or a very fine linen. The tint ought not to be red, it is too dark; nor white, it looks too clear; but connecting both, say pale rose. When dry (drying requires one or two minutes' time) the skin must be quite covered, and dull. If such preparation could not be obtained exactly as required, it is very easy to have it made in such a manner that it could be washed off with great facility after the negatives are taken; a wet towel only would be necessary.

The "Rembrandt effects" obtained in that way would be unquestionably superior. I read lately somewhere that for that kind of lighting, negatives slightly foggy are the best: it is possible in one sense, but if the fog is necessary to the half tints of the face, it is sure to be wrong in the shadows of the clothing, as foggy negatives, as every one knows, do not print deep black, and the difference between the shadows of the face and the shadows of velvet clothing, for instance, are thus quite destroyed. By this method, on the contrary, everything is kept in its place; the clothing remains what it must be, when the yellowish tint of the face, covered by the rose powder of the liquid, becomes more transparent in the shadows without the necessity of using those white screens or reflectors by which false and hard effects are produced, and which I must say, *en passant*, are used a great deal too much.

I have no doubt that when reading the above suggestions many will think the method (so simple in reality) full of inconveniences and difficulties; but this would not surprise me, as when something unusual is proposed it is at first rejected, without consideration or trial, as being impossible or worthless; although, I can say that if the precaution be carefully taken, if cleverly and quickly executed, sitters would be pleased with it.

How many troubles, expenses, and losses would be thus avoided, chiefly in country towns, where the photographer, being at times very busy, and attracted by some advertisements of negatives retouched at 2s. per dozen, is unfortunate enough to rely upon them, and does not hesitate to send negatives to those "artists." How deceived he is when returned! All the skill and pains employed by him for obtaining a good negative are useless, the likeness is now destroyed, the picture without any artistic value Indeed the case is common enough, and everything ha been so much improved lately, that no doubt we shall b informed very shortly of a new process of retouched negatives at so much per pound. It is really a pity to see how retouching, which is by itself of so considerable value in photography, is undertaken by so many careless and awkward hands; this is the cause of the unfavourable judgment against the art by certainly very clever men, who now consider it not only as being useless, but the complete ruin of a good picture. My opinion is, that a bad retoucher will certainly ruin a good negative, but a skilful hand will surely improve it, and his work is indispensable to a good general effect; to say the contrary would be like condemning the art of painting on looking at a bad picture.

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* Written for Year-Book for 1878.

One need not be surprised, therefore, if, under so many difficulties encountered with the process, attention has been attracted by the possibility of using mechanical means which would be of constant and uniform application; but as yet no satisfactory result is arrived at; the methods introduced till now are, as I have said above, difficult, dangerous, uncertain, and the result in all cases is inferior to the usual process; on the contrary, the one I speak of is sure to give superior results, is easy to introduce in the studio, is quick, and of constant uniformity. If, by negligence or other reason, it does not come into practice, it is quite useless to think of suppressing retouching. As for my own part I am convinced that this is the only mode possible to make manual work unnecessary, I would, in concluding, advise photographers to pay a little more care and attention, as, although one of the most important branches of photography, it is generally very much neglected.

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TALKING PHOTOGRAPHS.

Under this heading Mr. Wordsworth Donisthorpe recently writes to *Nature* as follows:—

"An article from the *Scientific American* on the phonograph which is quoted in *Nature*, vol. xvii., p. 190, concludes as follows:—'It is already possible, by ingenious optical contrivances, to throw stereoscopic photographs of people on screens in full view of an audience. Add the talking phonograph to counterfeit their voices, and it would be difficult to carry the illusion of real presence much further.'

"Ingenious as this suggested combination is, I believe I am in a position to cap it. By combining the phonograph with the kinesigraph I will undertake not only to produce a talking picture of Mr. Gladstone which, with motionless lips and unchanged expression, shall positively recite his latest anti-Turkish speech in his own voice and tone. Not only this, but the life-size photograph itself shall move and gesticulate precisely as he did when making the speech, the words and gestures corresponding as in real life. Surely this is an advance upon the conception of the *Scientific American!*

"The mode in which I effect this is described in the accompanying provisional specification, which may be briefly summed up thus: Instantaneous photographs of bodies or groups of bodies in motion are taken at equal short intervals —say quarter or half seconds—the exposure of the plate occupying not more than an eighth of a second. After fixing, the prints from these plates are taken one below another on a long strip or ribbon of paper. The strip is wound from one cylinder to another so as to cause the several photographs to pass before the eye successively at the same intervals of time as those at which they were taken.

"Each picture as it passes the eye is instantaneously lighted up by an electric spark. Thus the picture is made to appear stationary while the people or things in it appear to move as in nature. I need not enter more into detail beyond saying that if the intervals between the presentation of the successive pictures are found to be too short, the gaps can be filled up by duplicates or triplicates of each succeeding print. This will not perceptibly alter the general effect.

"I think it will be admitted that by this means a drama acted by daylight or magnesium light may be recorded and reacted on the screen or sheet of a magic lantern, and with the assistance of the phonograph the dialogues may be repeated in the very voices of the actors.

"When this is actually accomplished the photography of colours will alone be wanting to render the representation absolutely complete, and for this we shall not, I trust, have long to wait."

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Correspondence.

DISTORTION.

Dear Sir,—Permit me to contribute a line to the discussion on distortion in architectural photography.

We all know that the eye is not satisfied unless vertical lines be represented as parallel, and most of us know that if we use a non-distorting lens, and expose the plate in a vertical position, all objects vertically upright will be correctly represented. Mr. Sawyer seems, in the discussion you report, to have doubted this perfect accuracy of representation, the fact not being present to his mind that the diminishing angle actually subtended at the lens by two vertical lines (or by two horizontal lines either) as, while produced on planes parallel with that of the sensitive plate, their distance from the lens continually increases, is exactly balanced by a corresponding diminution in the angle, and a precisely proportional increase in the distances, from the lens to the sensitive plate. It is but a carrying out of the law expressed when we say that an object and its image (radiant and conjugate, in technical language) subtend equal angles at the centre of the lens. Carry out this law (which is absolute in a non-distorting lens, and in a symmetrical doublet the correction for distortion may be made absolute) for all parts of the subject, to the corresponding parts of the image, and it is demonstrable that where the plane of the sensitive plate is parallel with the plane of the subject, no distortion in that plane remains with a properly corrected lens. Thus theory and practice agree. It is a matter of detail how far we shall combine rising front, swing-back, or swing-front, to obtain this parallelism. A master of his tools will often not hesitate, as I do myself with very large direct pictures, purposely to over-correct the distortion of his lenses, that he may have the less to do with his swing-back or rising-front, to obtain that perfect parallelism of vertical lines which the eye imperiously demands. When we fail, we know who is to blame—not nature, not often our lenses, certainly not our opticians, but ourselves.—I remain, sir, your obedient servant,

106, *High Street, Oxford.* W. H. Wheeler.

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Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting was held in the Hall of the Society of Arts on the evening of April 3rd, Mr. **Frank Howard** in the chair.

The minutes were read and confirmed, and Mr. G. Maitland was elected a member of the Society.

Mr. **Foxlee** read a paper on "Some Hints on the Gelatine Process" (see page 169). The paper was largely devoted to experience in keeping gelatine free from decomposition, alcohol having been found most efficient in preventing decomposition. Several samples illustrating the paper were exhibited.

Mr. **Wainwright** asked how far alcohol affected the sensitiveness of the emulsion.

Mr. **Foxlee's** experiments had chiefly been devoted to the question of decomposition, but he did not think that the sensitiveness of emulsion was injured by the addition of alcohol to the emulsion.

Mr. P. **Mawdsley** exhibited some negatives and some transparencies of a drawing-room interior illuminated only by artificial light, produced on gelatine emulsion plates. Some of the negatives were produced by Mr. Bennett, and some by himself. Mr Bennett's were produced with a single lens, aperture $\frac{f}{12}$; the exposure was one hour. There was a three-light chandelier and a duplex lamp burning. The other plates were exposed twenty minutes, aperture $\frac{f.}{6}$

Mr. **Kennett** said that although it was possible to preserve gelatine from decomposition the emulsion was always at its best when freshly made, within (say) five hours of its being ready for use.

Mr. W. **Brooks** exhibited some reproduced negatives and some enlarged negatives on emulsion plates, which were very fine.

Mr. **Lysaght** showed some plates developed with ferrous oxalate.

Mr. **Nisbett** showed some negatives from emulsion plates.

Mr. **Ayres** showed a clever model of a contrivance to secure ventilation, and some vessels to secure a constantly filtered solution.

The proceedings then terminated.

Edinburgh Photographic Society.

The sixth ordinary meeting of the above Society was held in 5, St. Andrew Square, on Wednesday, the 3rd inst., Dr. **Thompson** in the chair.

The following gentlemen were unanimously elected ordinary members of the Society :—Messrs. T. N. Christie, Francis Briglemen, W. Maule Borley, F. Moore, W. Iveson Macadam, and James Lyle.

Mr. T. **Bashford** then read a paper contributed by Mr Payne Jennings—“ Remarks on Landscape Work and its Relation to Art ” (see page 170). The paper was illustrated by a large number ot exqusite landscape studies, which excited the enthusiastic admiration of all present.

The **Chairman**, referring to Mr. Jennings' contributions, remarked that he had heard many papers read on artistic matters, but none with more practical value. The author had illustrated his remarks by works of his own productions, showing that the writer had much more than theoretical ideas to treat upon, having reduced all he had to say to practice, as shown by the very numerous art-productions exhibited.

Mr. W. **Nelson** said, that while on a visit to Pitlochrie, he had, of course, admired the beautiful scenery; but, when he desired to take photographs of some of the views, he found the greatest difficulty in selecting a scene that would be harmonious as a photograph.

Dr. **Hunter** had experienced great difficulty in selecting a point of sight that would render within the bounds of one negative a harmonious composition that might justly be called a picture, and congratulated Mr. Jennings on his great success in this particular. The difficulties surmounted greatly enhanced the value of such renderings of nature as Mr. Jennings had submitted to them.

Mr. **Mickie** was greatly impressed with the peculiar picturesque beauty of some of the illustrations, and knew that such results could only be obtained by one possessing high art-feeling, being at the same time one who could “ bide his time ” till nature was in a favourable mood to assist him in rendering his conception of the scene, and who, when the right moment arrived, also possessed the necessary ability to seize and perpetuate it. From his own profession as an artist he knew some of the difficulties a photographer laboured under, as, to a very large extent, he must render forms exactly as they are, and he is not at all times able to control or modify repeating lines and objectionable features, though they could be altered to any extent if rendered by hand. Bearing these difficulties in mind, he was much impressed with the triumphant vindication of the art possibilities of photography as exhibited in some of the pictures by Mr. Payne Jennings.

Mr. M. G. **Dobbie** remarked that numerous papers had been read to the Society bearing more or less directly on the relation of art to the science of photography, and requests had been made over and over again to our artist members to accompany the Society on its outdoor excursions, and practically instruct the members in really artistic work. In more instances than one this had been done advantageously. Now in this paper of Mr. Jennings' we had the result of that gentleman's experience in a practical shape, and when combined with such an authority it was of the highest value. There could be no doubt about the fact that one of the essential requisites—indeed, the leading element in the production of a good photographic landscape picture—was artistic knowledge on the part of the operator; in fact, it required brain work, and a correct idea of the beautiful in nature in order to stamp the picture with a true sense of individuality and excellence. No amount of mechanical skill, without the element just referred to, would or could produce a landscape picture in an artistic sense. Mr. Jennings had demonstrated the truth of this in such a way that no one could contradict; not only so, but the very beautiful examples of his own work which accompanied his paper gave practical illustrations of the fact. Mr. Jennings, judged by his pictures alone, was an artist possessed of fine discriminating taste and judgment, and he combined with that an enthusiastic love of the photographic art; hence his success—a success which had gained for him a world-wide renown. He (Mr. Dobbie) concluded by proposing a vote of thanks to Mr. Jennings.

This was carried unanimously.

Mr. John **M'Kean** then exhibited a new camera and tent combined. This was a very ingenious apparatus, being a perfect dark tent for wet plate photography in the field, and, at the same time, a camera, enabling the operator, if desired, to watch and modify the negative while being exposed, so that various times could be given to different parts of the view, allowing a harsh, badly-lit foreground to receive sufficient exposure without overdoing the delicate distance, and also securing on the one plate an instantaneous cloud effect. A yellow window facing the scene enables the operator to select the most favourable time to impress the plate, and several original and ingenious appliances are introduced to faciliate operations and reduce to a minimum the troubles and somewhat bulky *impedimenta* that the ardent wet-plate worker has to contend against compared with his dry-plate brother. The whole is intended to stand on a very rigid form of tripod. The apparatus in all its details was examined with much interest, and a vote of thanks was heartily accorded to Mr. M Kean.

The **Chairman** next submitted a proof impression of the presentation print for the current year. It is a beautiful reproduction of Sir Noel Paton's well-known picture, “ I Wonder Who Lived in There,” and all members who have paid their annual subscription of five shillings will be entitled to a copy of it. The picture is of large size, beautifully printed in pigmented gelatine by Mr. W. H. Davies. It is mounted on cardboard with a tint, and suitably engraved title. Of course it is worth in itself far more than the annual subscription to the Society, and it is recommended that all persons who wish to become possessors of this really fine work should send in their subscriptions at once, as only the exact number of copies absolutely required will be printed, this being one of the conditions attached to the artist's generous permission to reproduce the picture.

In the question box was found an enquiry as to the manufacture of collodio-bromide emulsion used by many members of the Society.

Mr. A. **Mathison** said the details had been so often explained to the Society, and published in its reports, that any one could find all the working particulars with formulæ; still, as a good many enquiries had been made since the last meeting of the Society, he would again give the formulæ. The collodion is what is known as Mr. Aird's, and is almost identical with that published by Messrs. Sayce and Bolton about twelve years ago :—

Ether (methylated)	6 drachms
Alcohol (pure)	2 ,,
Pyroxyline	6 grains
Bromide of cadmium (anhydrous) ...	6 ,,
Bromide of ammonium	3 ,,

The sensitizing solution for one ounce of salted collodion is composed of—

Alcohol (pure)	2 drachms
Nitrate of silver	12 grains

Place the silver in a test tube, and add a few drops of distilled water. Apply heat until the silver is dissolved; now add the above alcohol. Shake, and reheat in order to redissolve the silver, which, most probably, has been thrown down in a fine powder, when the cold alcohol is added. Now add this alcoholic solution of nitrate of silver, a drop or two at a time, to the salted collodion, shaking vigorously after each addition. Let the test tube rest in a cup of hot water while shaking the collodion, in order to keep the nitrate of silver dissolved. Test the emulsion thus prepared, and see that there be a very slight excess of bromide; it will then be found on the following day to be neutral. When the emulsion has been made about two days it is better than when quite new, and if neutral it will keep indefinitely. Coat the albumenised plates with the emulsion, and wash under the tap till all greasiness disappears; then apply the preservative :—

Tannin	10 grains
Sugar	5 ,,
Water	1 ounce

This makes a hard, sensitive film; or common bitter beer may be used instead, when the plates are less sensitive. The plates require to be "backed." The tannin-preserved plates necessitate bromide to prevent fogging, and also require that the plates be flooded with alcohol previous to development, in order to soften the film. The beer plates do not need bromide, and only require the backing to be removed with a damp sponge, and to be simply washed under the tap prior to development, which is, of course, the ordinary alkaline pyro.

Votes of thanks brought a most enjoyable meeting to a close.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Board of Management of the above Association met on Wednesday, April 3rd, at 160a, Aldersgate Street.

The following gentlemen were elected as ordinary members of the Association:—Messrs. Wratten, Reilly, and Marschall.

The other business of the evening having been completed, the meeting adjourned till May 1st, at 8 p.m.

PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the January meeting, after the exhibition by Mr. **Clinton Roosevelt** of a picture of himself made by Professor Morse just after his return from France, about 1842, accompanied by some remarks on the subject of producing tints by fine ruling, the discussion (which we subjoin) turned chiefly upon the use of coloured glass, and a developer for emulsion plates.

The **President**: The effect of coloured glass in copying objects with a variety of tints was introduced at the last meeting, since which time I have made some experiments with blue glass in copying. It was claimed by Mr. Chisholm that he photographed a coloured object, or an object with a variety of colours, much quicker when a piece of blue glass was interposed near the diaphragm of the lens. Mr. Chapman doubted the correctness of the conclusions to which Mr. Chisholm arrived, and gave his reasons, which you have heard read in the report. He did not think that the wave lengths of the light reflected from the object were changed at all in their actinic properties by passing through a coloured medium. But there appeared to be such a variety of opinion upon the subject that I prepared several glasses, and brought one along. I took very thin 8 by 10 glass, and coloured one-half of it blue. I covered sections of a chromo with the blue glass, and photographed it. Here is the chromo and the prepared glass (exhibiting with the resulting negative and print a chromo entitled "Now I'm Grandmother," and a piece of glass, one-half of which was coloured blue). The **President** then explained how he placed the glass over the chromo, so as to have one-half of the picture covered with the blue glass, and the other with the clear glass, the line running straight down the centre of the chromo, the effect being to turn the reds to crimson, the yellows to greens, and the browns to a darker brown, on the half of the chromo covered with the blue glass. He also covered smaller sections of the picture with blue glass, leaving larger sections uncovered. In making negatives of the chromo under these conditions, you will perceive by examining the negative and print that there has been no perceptible difference in the photographic action between the part covered by the blue and that portion covered by the clear glass. I had always held to the theory that the whole was more than a part, and had always maintained that blue light was not as quick in its actinic action theoretically (I had not tried it) as white light.

Mr. **Chapman**: Mr. President, what position do you take with regard to that covering the object with glass one-half of which is coloured blue?

The **President**: That it makes no difference.

Mr. **Chapman**: Cover half with glass, and leave the other half uncovered; is there any difference then?

The **President**: I took a piece of blue glass and covered one-half of the picture, leaving one-half without glass. There was no difference; there was no line.

Mr. **Chapman** objects to the experiment, claiming it to have been faulty, and that the blue would make some difference. It would make the same difference in proportion as ten times the amount of blue used. That the length of exposure would materially modify the experiment; a short exposure would show a variation not to be seen by a long exposure. That the proper way was to test it by an actinometer.

Mr. **Mason** expressed his gratification at seeing the result so near as he claimed it would be. He did not understand that Mr. Chapman's proposal to test it with the actinometer would be exactly fair, as Mr. Chapman's actinometer was so constructed that by standing this glass in front of the instrument, the light being at one end, the angle would be continually differing; and if you put the glass perpendicularly to the light, then the polished surface of the glass would refract or reflect more light in proportion to its distance from the gas flame.

Mr. **Chapman**: I think the picture is made slower by glass being over it in this way. I should prefer to place the blue glass near the diaphragm.

Mr. **Newton** explains that the half of the picture not covered with the blue photographed precisely the same as the covered half.

Mr. **Chapman**: I think that blue glass placed directly in front of the lens would work a little quicker, because the rays of light strike upon it more perpendicularly.

Mr. **Newton**: I don't believe that the position of the glass would produce any difference of effect. I have another matter, which is in relation to a developer that was given to me confidentially by Mr. Willis, author of the platinum printing process. It will be recollected that he exhibited a large number of pictures printed by that process at our meeting in May. Immediately after that meeting he came to my house, and gave me a new developer for developing emulsion plates, either wet or dry. For certain reasons (stated) I did not feel at liberty to make the process public. A few days before Mr. Willis's return to Europe, in November last, he again called on me. He stated that he should direct the editor of an English photographic journal, with whom he left the manuscript giving all the details of the process, to publish it about the first of the present month. I therefore now feel at liberty to give the process here, as it will undoubtedly appear in the foreign journals before it does in our published proceedings. The composition of the developer is as follows:—Forty or fifty grains of neutral oxalate of potash dissolved in one ounce of water; add sufficient ferrous oxalate to the solution to produce an orange colour; or a more simple method is to add to the oxalate of potash solution a few drops of a saturated solution of protosulphate of iron, to produce the orange colour. Then add two drops of acetic acid No. 8, or enough to make a slight acid reaction on litmus paper. This solution is then flowed over the exposed plate in the ordinary manner. The image develops more slowly than with the alkaline pyro developer, but proceeds satisfactorily and without fog. So far as my experiments go, I am inclined to the opinion that a little longer exposure is necessary with this developer than with the carbonate of soda. You will see by the prints exhibited that the action in the shadows and dimly lighted portions is very marked and peculiarly fine. (The President then exhibited a number of negatives produced by this process, and prints from them.)

Mr. **Mason**: Did you immerse or flood the plates in developing the image?

Mr. **Newton**: I flooded them. I have tried it only on wet emulsion plates. My experiments with this developer have been limited. I have not discovered anything peculiar in its action, so far other than stated, with this exception, perhaps, that it can be used repeatedly without limitation, a little addition of the iron occasionally being necessary. Neutral oxalate of potash is very easily prepared. The most simple way is to make a saturated solution of carbonate of potash in hot water; then add to this solution oxalic acid in crystals, until neutral. This will give a precipitate of the neutral oxalate of potash, the natant liquid being a saturated solution of the same salt, which can be used by being reduced to the required strength.

Dr. **Higgins**: Chemically pure oxalate of potash is a commercial article, and sells at $2 00 per pound. I would like to ask the President if he had tried the alkaline developer for strengthening negatives made with the oxalate developer before fixing?

Mr. **Newton**: I think I did, but I not am quite certain. In reference to the expense of the oxalate of potash, I would say, that I have prepared it with both the chemically pure carbonate of potash and oxalic acid, and also with the ordinary commercial articles, and discovered no essential difference in the developing properties of either. The cost of that obtained with the commercial salts would not exceed fifteen cents per pound, exclusive of the labour of preparing.

Mr. **Mason**: What guide did you have for determining the amount of the ferrous oxalate?

Mr. **Newton**: It does not appear to make a great deal of difference. Ferrous oxalate is not soluble in water, but it is to some extent in the oxalate of potash solution. Mr. Willis said he had introduced it to a gentleman in Paris, a worker in dry plates, well known; he found it was very much quicker than the developer that he had been using.

Mr. Chapman moved that the subject of keeping bromide emulsion dry plates after exposure, and before developing, be placed in the hands of the experimental committee for determining how long after exposure the image could be successfully developed. I have found it difficult to develop the image if the plate is kept several months after exposure. My trouble may be that the preservative solution was not of sufficient strength. I would like to have the subject investigated by the committee.

Talk in the Studio.

Photography Foreshadowed.—A correspondant sends the following to the *English Mechanic*:—"The first prophetic allusion to the photographic art, the discovery of which was to take place eighteen centuries later, is perhaps found in the story of the miraculous occurrence told in the life of St. Veronica. The second instance is about the year 1690; but intermediate instances may probably be found. I extract from the works of Fénelon the following passage from an imaginary voyage in 1690:—'There was no painter in the country, but when anyone wished to have the portrait of a friend, a beautiful landscape, or a *tableau* which represented any other object, he put water in large basins of gold or silver; then placed this water opposite the object he wished to paint. Soon the water congealing became like a looking-glass, in which the image of that object remained ineffaceable; and it was a picture as faithful as the brightest mirrors." One could wish that the author had entered into detail as to the manner 'of placing this water opposite the objects he wished to paint.' The third instance is about 1760, that is seventy years later, and seventy-nine years before 1839, the date of Daguerre's discovery. It is reported by Ed. Fournier, who extracted from what he calls 'un assez mauvais livre,' written by a certain Tiphaigne de la Roche, the entire passage, extremely curious, but rather long. This passage contains many details. The 'water' of Fénelon is replaced by 'a material very subtle, very viscous, and very ready to dry and harden.' 'They' (certain 'elementary spirits') coat with this material a piece of linen, and present it to the objects which they wish to paint,' &c. In the two last examples the pictures formed reproduce the images of the objects, with their natural colours and their forms, so that the objects are seen as if reflected in a mirror. The photographs of the present day are still very far from this ideal perfection, which, however, they will probably never cease to approach without ever being able to reach."

Direct Copies from Prints.—The same gentleman describes M. Pellet's mode of copying without the use of a negative. He says:—"Mons. Pellet presented a new process which could give blue lines upon white paper, which rendered the process very valuable for the reproduction of drawings for engineers, architects, &c. The sensitizing solution is composed as follows:

Oxalic acid	5 parts
Perchloride of iron	10 ,,
Water	100 ,,

This solution can be modified according to the sensibility required. The oxalic acid can be replaced by any of the other vegetable acids. If the paper has not been sufficiently sized, gelatine, gum, isinglass, or dextrin can be added to thicken the solution. When dry, the paper preserves its sensibility very well, which sensibility is very great. In order to reproduce a map, a sheet of sensitized paper is placed under the map, and if in summer and in the sun, fifteen to thirty seconds is sufficient to decompose all the parts not protected by the black lines. By the action of the light the salt of iron is reduced into protoxide. This salt is not acted upon, as the former, by a solution of yellow prussiate of potash, therefore those parts protected by the black lines turn blue. After exposure, the paper is plunged into a bath of prussiate (15 to 18 per cent.), and immediately the design appears in blue. The paper is then rinsed in cold water and plunged into a bath of chlorhydric acid (8 per cent.), in order to dissolve out what may remain of the protoxide and whiten the paper; the proof is then washed and left to dry. The experimental demonstration which Mons. Pellet gave before the Society obtained a great success. I remember quite well having seen, during my visit to England, a similar result obtained by Mr. Willis, Senr., although I do not remember by what process."

To Correspondents.

To Agents and Advertisers.—Next Friday being Good Friday, the Photographic News will be published on Thursday, April 18th. Advertisers should send in their Announcements not later than Wednesday, the 17th.

H. M. S.—Ammonia is not necessary in a bath of bichromate for carbon printing; but many think that there is an advantage in its use. 2. The degree of surface polish in the finished picture is due rather to the polish of the plate glass and the skill in the manipulations generally, than to the quality of the collodion. Any good tough collodion will answer. You had better adhere to the form of actinometer you are using, and with which you have become familiar.

H. C. Bury.—It is difficult to say what will best fill up the cracks, &c., without knowing their size, and, indeed, all the circumstances. We should have recommended putty or paper, but you seem to object to these. Probably if you used either, and then painted, you would get rid of your trouble.

J. J. H.—The cyanotype process is one of the processes invented by the late Sir John Herschel. Take 140 grains of ammonia citrate of iron, and 120 grains of red prussiate of potash, and dissolve in 2 ounces of water; apply to the surface of the wood, in the dark-room, and dry; expose, and wash in water; this removes all the sensitive salts unaltered, and fixes the image.

M. D. F.—Yes; there is no difficulty in the matter; and for the purposes of the amateur it is often very convenient. We keep chloride of gold in a stock alcoholic solution. A 15-grain tube of chloride of gold is placed in a two-ounce bottle with 15 drachms of alcohol. One drachm thus contains one grain of the gold salt. To make a toning bath for immediate use, we take a little prepared chalk, about half a teaspoonful, and make it into a thick cream with a drachm of the gold solution. To this we add hot water, about five or six ounces, and as soon as it is cool it is ready for use.

J. F. D.—The prints you enclose are bleached by the use of a toning bath not in proper working order. It has apparently been used too soon after it was mixed. A fresh mixed toning bath to which carbonate of soda has been added will frequently produce the mealy bleached effect your prints present. It is probable, moreover, that the negative is not so vigorous as is desirable to produce brilliant prints.

J. K. C.—The powder process is the same in principle as Joubert's enamel process. The patent of that is, however, expired. There is nothing to prevent your use of the powder process, if you have skill to do so. The substitution process is now chiefly used for enamel work.

Bromo.—The precipitate which forms in your solution of citric acid and silver is citrate of silver, and its formation weakens the solution very much, as citric acid, being a tribasic salt, one atom requires three of silver to form the salt. The addition of an extra proportion of citric acid will sometimes prevent the precipitation.

Perplexed.—The development of enlargements on paper with pyrogallic acid requires great skill and precision in working to avoid stains. The addition of a grain of common salt to about six ounces of the pyro solution will often aid in securing cleanliness. Gallic acid is a much more manageable developer under such circumstances. When a tuft of cotton wool is used for applying the solutions, great care is required to see that each piece is fresh and clean. For apylying the pyro we like the plan better of turning up the edges of the paper so as to form a tray, and then flooding the surface with the developer.

W. Basham.—Thanks for the expression of your good opinion of our Year-Book. Thanks, also, for the suggestion, which shall appear in an early number.

Ernest Duby.—Many thanks. We shall have pleasure in receiving the translations of the articles you mention.

G. G. F.—Tincture of iodine consists of a solution of iodine in alcohol. It is of different strengths. About ten grains to the ounce is a useful strength. Iodine is very sparingly soluble in water, but it is soluble in an aqueous solution of an alkaline iodide. A solution of iodide of potassium, for instance, will dissolve one grain of iodine for every two grains of iodide of potassium present.

Several Correspondents in our next.

The Photographic News, April 18, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Photographer's Travelling Outfit and the Paris Competition.—Reproduction of Shakespeare's Plays by Photo-lithography.

A Photographer's Travelling Outfit and the Paris Competition.—It is not an easymatter, evidently, to construct a perfect travelling outfit for a photographer. Our French neighbours have been trying what prizes will do in the matter of developing the ingenuity of designers and instrument makers, but, so far, with little success. The difficulty is to know what is meant under a travelling photographic equipment. In the case of the Paris competition a medal worth five hundred francs was to be awarded to an "apparatus which best fulfilled the conditions of simplicity, lightness, and portability, without sacrificing any contrivance which increased its utility as a photographic instrument." Obviously, these conditions are capable of being strained very much indeed, and really one hardly knows what to anticipate as the result. Indeed, it is more than probable that those entrusted with the drawing up of the terms were as clouded in their ideas as to what the apparatus was likely to be, as any one else. To us it has always appeared that, within certain limits, the bulk or size of the apparatus has very much to do with its efficiency. A travelling photographer, be he a tourist, an amateur, or professional, must, it seems to us, always choose between two evils—impedimenta, and uncertainty. If he cannot be troubled with much baggage, then he must submit to the risk of obtaining uncertain results; if he *must* have perfect pictures without fail, then the weight of his baggage is bound to be somewhat great. If one is a careful man—we do not mean exactly of that stamp about whom George Grossmith sings:

Who did not know the time—it may appear a silly thing:
He never would wind up his watch, lest he should break the spring—

but one who will under no circumstances run the risk of failure, then the wet collodion process, with tent and laboratory complete, are the only things ever likely to fall in with his notions of what a complete travelling apparatus ought to be. On the other hand, an amatuer—a pedestrian, may be—who foots it over the mountains carrying his own knapsack, and with whom photography is not the first thing to be considered, but rather an adjunct to his pleasure—he requires a very light and compact equipment to be able to carry it at all. His first question possibly would be as to weight, and the answer would influence him more than anything else. Therefore, from our point of view, we are not at all surprised that the Paris competition should have ended in so much indecision. There were practically only three competitors, and the jury divided the money between them. One was M. Jonte, whose clever camera, holding a dozen plates, many may have seen in Pall Mall two years ago; he received a medal of the value of two hundred francs. Another competitor was M. Roger, who received an award of the same value, while a medal costing one hundred francs was given to M. Wils. The Committee acknowledged that the issue of results was an unsatisfactory one, and that the Minister of Public Instruction should be asked to offer another five hundred francs for competition, in the hope that a better result might be obtained, and in the expectation that not only Parisian but foreign instrument makers would compete for the medal. We cannot help thinking that the conditions are altogether too vague, and we should suggest, in the first place, that it would be well to specify whether the apparatus is to be fit for dry or wet plate work. If this were done matters would be narrowed at once, and there would be a likelihood of the Committee coming to a sound decision. For instance, if a dry film only were to be employed, it would be difficult indeed to beat Mr. Warnerke's capital roller dark slide arrangement, either for lightness, portability, or handiness; but of course one cannot take pictures by its means as rapidly and trustworthily as by the wet process. A camera apparatus which would permit of coating and sensitizing plates in the open air, as well as developing, and perhaps fixing them, is hardly likely to be invented which could compete in the matters of weight and compactness with the dark slide; but yet, in a trial of the two, it is probable that the former would yield better negatives, or at any rate the result, whether good or bad, would be bereft of all uncertainty. We have instanced only two extremes, but there are of course many kinds of apparatus known to photographers in which the elements of rapidity and certainty are increased, with a consequent decrease, however, in the smallness and lightness of the aparatus. Gelatino-bromide plates have been prepared, as many are aware, as sensitive in their nature as wet collodion, while, again, there are ingenious methods of development known, by which you can assure yourself at once of the success or otherwise of the dry plate you have just exposed. But, in the end, it is pretty well as we have said. By increasing the certainty of your work you increase also the bulk and weight of your impedimenta, and very few will be found to agree as to the precise point where the line is to be drawn. Our military service, which has extensively adopted photography, affords a good illustration of what we mean. To each Army Corps we attach a photographic outfit, complete in every way. Many might be disposed to laugh at it, by reason of its very completeness. It is a roomy two-horse waggon, fitted up so as to be employed either as laboratory or printing room. Every facility exists for employing the camera for photo-lithographic purposes, for surveying, for simple copying, for landscape and portrait work, even for the production of comparatively minute plans and despatches. It is a well fitted waggon that here represents a complete travelling photographic equipment, but, at the same time, there is a small roller dark slide to hand, and a miniature lens and camera, which a mounted officer could carry in a strap slung across his shoulder as easily as he does his field glass. Both equipments are complete in their way as travelling equipments.

Reproduction of Shakespeare's Plays by Photo-lithography.—The Duke of Devonshire, we are told by the *Athenæum*, "has authorised the reproduction (? production)' of photo-lithographic facsimiles of his copies of the first and second quartos of 'Hamlet' and certain other first quartos of Shakespeare's plays." The work is to be undertaken by Mr. W. Griggs, whose skill as a photo-lithographer is well known. There is much experience necessary in the proper carrying out of such, simple as it may appear to those who have never had to prepare the transparent and opaque negatives required in the work, and do not know of the difficulties in making clean transfers. The yellowness of the paper, and the accidental stains and blotches met with, give rise to endless work, which only severe patience can overcome. Fortunately, the ink employed in these old editions preserves its raven blackness, and the type is of a sufficiently solid character not to require coaxing; but the difficulties of working up an even and opaque background are still very great. It says much for the development of the art of photo-lithography when we hear it announced that "it is hoped that the facsimiles may be issued at the cost of six shillings each to subscribers, and that the series will contain all the first Shakespeare quartos and many other early plays and scarce tracts." We fear the value of originals will be sadly affected if photo-lithography is employed much in this kind of work; but, on the other hand, the diffusion of knowledge, in permitting many minds to study from truthful copies of the original, will be great indeed. Moreover, the art provides us with a good insurance against losing rare works by fire or theft; the original Doomsday Book, for instance, now we possess photographic facsimiles of it, cannot be considered half so precious as before.

REMARKS ON DR. MONCKHOVEN'S PAPER.

BY W. S. BIRD.*

For all practical purposes, it may be said, the fading of carbon prints is simply a question of the pigments employed. Lampblack, Indian ink, red chalk, and the various earthy colouring matters employed on the bases of carbon pictures, can be relied on with absolute confidence, but as more brilliant effects are demanded, and as it is sought to emulate the beautiful tones obtained in silver printing, it becomes quite possible to fall under suspicion. The seductive beauty of the cochineal lakes has been dallied with by most tissue makers. Carmine has not only added bloom to the cheek of Phyllis, but has imparted lustre to a good many gelatine pictures. In pigment printing, however, this delicate colour was used very sparingly, until M. Lambert, of chromotype renown, demonstrated the latent capabilities of carbon to rival, and perhaps surpass, the finest picture obtainable by the older method. This gentleman possessed an admirable tact of manipulation, and had so deftly combined all previous experience, as to produce from portrait negatives more beautiful pigment pictures than had been known before his time. His results were almost unique, the labours gave a decided impetus to carbon printing, and although the preference for a roseate hue (at that time only obtainable by cochineal) led to a temporary vitiation of the standard of permanency, yet this was counterbalanced by the incentive it gave, in various directions, to provide substitutes for the cochineal lakes, and to the production of permanent tissues of finer structure, and more variety and brilliancy of tone. I have placed on the wall a frame of twelve cabinets, the work of Signor Ferranti, of Liverpool, produced while Lambert was in England, and with the tissue he recommended. These pictures were printed nearly three years ago, and after exhibition at Edinburgh, have hung in the Autotype Gallery. If compared with a card of nine cartes-de-visite adjoining, recently produced with the same tissue, the members will be able to discern the minute loss of bloom from two years' exposure. It will be observed that the delicate half tones of the picture are perfectly preserved, and fifty years hence, although the tone will be still cooler, there is no reason to fear but that they will remain charming photographs, creditable to the artist, and evidencing a high degree of mechanical perfection in the tissue employed.

In the paper before us we find a statement that the vitiating action of light upon colour is interfered by the presence of the chromate salt, and that while alizarine pigment by itself will slowly change under the influence of the sun's rays, if the alizarine be in combination with gelatine in the form of a carbon print, the change will be greatly accelerated. This is singularly opposite to the fact with regard to carmine, which, employed in carbon tissue, manifests a power of resistance to light immensely superior to that possessed when uncombined. If any one spread cochineal lake in a thin layer on paper, he will not wait long before perceiving a change under the influence of light. Despite the theory that the ordinary washing, and fixing, of a pigment print leaves an imperfectly deoxidized chromic salt to facilitate decomposition of the colour, it does not apply in the case of so delicate a pigment as carmine. Probably the antiseptic property of carbon in contact with a pigment of animal origin has something to do with it. Anyhow, it indicates that further experiment is desirable to avoid the danger of adopting hasty conclusions.

It has been long felt by the Company with which I am connected to be exceedingly desirable to abandon the employment of cochineal lakes; and my friend, Mr. Sawyer, has given much attention to substitute the products of alizarine. The alizarine colours appear to me to afford not only great beauty, and variety of tone, in combination with carbon, but to be free from objection on the score of want of permanency. They afford, as is well known, some of the most durable dyes known to commerce, and as far as careful tests, and a not inconsiderable experience, go, they can be enlisted in the service of the pigment printer with perfect safety. There is no difficulty in utilising aluminate of alizarine in a manner to give the tone required, without either rendering the tissue insoluble, or staining single transfer paper; but it requires very careful management and combination, so to prepare it as to avoid staining the picture when developed on a collodion film. Since the hitherto high reputation for permanency possessed by the alizarine colours is called in question by the experiments of Dr. Monckhoven, it has been deemed expedient to recommence testing in a critical manner the pigmented prints in which such colours are employed. As these tests have been continued for barely three weeks, and not the slightest change is discernible at present between the masked portion and that exposed to the sun, it would be futile to bring them before you this evening. Three months hence the evidence will be worth recording, and I can promise that the Autotype Company will place the results before the Society. It is, of course, perfectly easy for any member to test the matter himself.

Dr. Monckhoven has produced a very rich brown tissue with a peroxide of iron pigment, but although he was careful to give your Society his method of preparing alizarine aluminate, the indications he afforded for the preparation of his new peroxide of iron are too indefinite to be of practical use. There is no novelty whatever in the production of aluminate of alizarine, but the modification of an oxide of iron in such a manner as to convert it from a dull and opaque to a lustrous and transparent pigment is an achievement worth being recorded in detail. Whatever may be the mode of its preparation, it yields a fine colour; but it appears to be limited entirely to the brown shades, whilst the alizarine products readily lend themselves to combinations with permanent blue for attaining the purple tones.

In conclusion, I may be permitted the expression of my belief that, but for the existence of Swan's Patent, neither in England nor on the Continent would carbon printing have reached its present stage of importance. Without the probability of ultimate reward held out by patent, the capital and energy necessary to overcome the many practical difficulties would not have been overcome; but now that commercial success is shown to be possible, the lapse of the patent stimulates research, attracts fresh talent, and, by the exertions of new workers, will render the transition from a fugitive to a permanent process of printing more rapid and easy. The field is large, and by no means wholly won. Although for artistic purposes pigment printing offers a wide range of monochromic effect, and a special expression not competent to silver; and although for enlargements it affords features of decisive superiority, yet for the facile and certain production of small work of high excellence, there is still much to be desired. From my personal knowledge of the energy, ability, and scientific attainments of Dr. Monckhoven, I anticipate that his concurrence will be of great advantage to the cause of permanent photography.

It will be very interesting to receive the further details promised of his experiments for the suppression of bichromates in carbon printing, but in the present stage of the subject it would be difficult to discuss them with advantage.

The following letter on this subject, from Mr. J. W. Swan, will interest our readers:—

"Dear Mr. Bird,—Remembering the wish which you lately expressed to me that I should contribute somewhat to the discussion on Dr. Monckhoven's paper to-morrow, I take the opportunity of saying that I have read the paper with great interest, and that in the main I am inclined to accept, without dispute, Dr. Monckhoven's statements with regard to the tendency of carbon prints containing cochineal, or even madder colour, to change colour under the influence of light; and I heartily agree with him, that it is most desirable, if possible, to get rid of them altogether. The ephemeral character of the carmines of cochineal should be proclaimed as loudly and as widely as possible, in the interest both of carbon printing and of painting, for it is lamentable to think that even first-rate artists still use it in their most valuable works. To ascertain exactly the effect of light upon it, I produced prints coloured only with this beautiful but frail pigment, and exposed these, half covered up, to brilliant sunlight. I expected to find evidence of fading in the parts exposed to light, but I was astonished to find it so quickly: even twelve hours' exposure was sufficient to produce a marked lightening of the colour in the more delicately-tinted portions of the picture. After this experience, it is scarcely necessary to say I discarded the use of carmine, but I confess I found great difficulty in finding a perfect substitute for it, in so far as regards the brilliancy of colour. The best substitute that I could find, at the time (I am referring to twelve years ago), was purpurine, one of the derivatives of madder. I found I could get very bright purples with this, and tested it in the same isolated way in which, as I have already described, I tested carmine. I found that it was incomparably more resistant to the action of sunlight than carmine; still, it was not absolutely stable, and I felt that there was a want in this respect. Alizarine was just then beginning to be an article of commerce, and, as you know, I proposed its aid should be sought to overcome the difficulty. I see that Mr. Johnson and your firm, as well as Dr. Monckhoven, have all been working in this direction, and I believe a decided advance has been made by the employment of lakes, which are obtainable by means of alizarine, and a nearer approach has been made to permanence by their use as tinting pigments; for, it must never be forgotten, that that is the only function they perform, and that the basis—the solid ground, as it were—of carbon always holds good.

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* Continued from page 172.

"With regard to the iron pigments to which Dr. Monckhoven refers as efficient substitutes for vegetable reds, of course no one will dispute the advantage of discarding *totally* the use of the vegetable reds, *if* you can get all you want by means of oxide of iron. But is it possible? If Dr. Monckhoven has succeeded, I congratulate him. I tried hard, but found, after I had done my best with it, a certain lack of brilliancy which the public would not put up with.

"Dr. Monckhoven is right when he says that the iron red is only transparent whilst it is in a hydrated state; in that state, moreover, it is a foxy red with no purple shade in it—dry, and heat it in order to bring out the purple tint as in Indian red, and immediately you have an opaque and heavy colour, not well suited for the photographic purple (which is the only case in which there is the least occasion to use a colour of a questionable kind), then it does not—or rather did not in my hand—quite fulfil all the requirements of the case. Dr. Monckhoven speaks of the variety of reds obtainable from iron—the tints vary from yellow ochre to Indian red—and all sorts of rich *browns* are producible by means of them—but photographic purple! Well, as I have said, I shall believe it when I see it. As to the chemical part of the paper, I will only remark that, according to my experience, it only needed a very thorough washing to eliminate completely all the chromium compounds acted on by light, and that the only tint remaining is a very faint green. This tint is producible, as I have proved, by light alone, without any washing of the composition, if the gelatine mixture be suitable, as it may be, for the production of this complete action. I have observed that under the action of light a film of gelatine containing, besides the bichromate, sugar of milk and glycerine, has the yellow colour completely discharged, and a chromium green is exchanged for it. The *rationale* of this change of colour is evidently in favour of the generally accepted theory of the chemistry of carbon printing, which, I believe, I was the first to propound.—Believe me, dear Mr. Bird, very truly yours, JOSEPH W. SWAN."

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

GELATINE dissolves in acetic acid as easily as gum in water, which accounts for the fact that carbon pictures can be developed by acetic acid in the cold, because the unaffected gelatine is dissolved out. Weak hydrochloric, sulphuric, and oxalic acids have the same effect; added in very small quantities to the water, they will dissolve out the gelatine in the cold without decomposing it. Hot water will develop carbon pictures quicker, and with a more refined effect than the weak acids, and on that account its use is more generally preferred; but plates for photographic printing are better developed by acetic acid, because warm water penetrates and softens the exposed gelatine, and thus causes unequal swelling and contraction.

With respect to the action of different salts upon a concentrated gelatine solution, the author found that carbonates of potassium and sodium, and the sulphate of magnesium, will convert it into a fluid. Not only gelatine rich in chondrin is precipitated by alum, but also one which is rich in glutin is rendered tougher, and caused to set more easily by the same substance. Similar results are stated by Fleck, who also found that the sulphate, but generally not the chloride or the nitrate, could separate the gelatine from its solutions. Weak solutions of soda and potash dissolve and decompose the gelatine slowly in the cold, much more quickly when heated. Ammonia acts only as a weak solvent.

Weak gelatine solutions decompose easily, when the jelly becomes fluid, and smells strongly of ammonia. At a temperature of from 25° to 30° C., decomposition often takes place in forty-eight, sometimes even in twenty-four hours. The smallest quantity of carbolic acid acts as an antiseptic, and hence it can be with advantage used in photography, where, in consequence of the film taking a long time to dry, or because of some other slowly working operation, there is reason to fear that the gelatine will putrify; larger quantities of the acid will precipitate the gelatine.

Films of chromatised gelatine, which soon became insoluble in the dark—a circumstance which depends on the spontaneous reduction of chromic acid—cannot be preserved by carbolic acid, and, for this reason, the author holds the addition of the acid to the chromate bath for carbon papers to be of no use.

Salicylic acid has also been proposed as an antiseptic; gelatine solutions to which it has been added can be kept a long while, and dry quicker than the pure jelly. Alum also acts as an antiseptic, and is added in smaller quantities to the gelatine in the course of manufacture, to prevent putrefaction, if it should be dried during unfavourable weather. When mixed with the gelatine in large proportions, glycerine is an excellent preservative, a property which is of great advantage in the manufacture of printing rollers made of glue and glycerine. A proposal of Lanjorrois to keep the gelatine from putrefying by means of fuchsin cannot be recommended for a photographic process depending on the use of the chromates, because bichromate of potash forms with fuchsin the chromate of rosaniline, which is insoluble. The employment of zinc chloride and of hydrate of chloral has also been suggested as antiseptics, but, at any rate, a gelatine which has begun to decompose must not be used for producing photographic pictures, for it will lose all its firmness and consistency, and, besides that, it becomes intensely soluble with potassium bichromate or gelatine.

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* Continued from page 173.

The author next treats of the action on gelatine of the chromic acids and chromates.

Weak chromic acid coagulates the gelatine, which can then again be melted by heat. The bichromate and monochromate of potassium, as well as the chromates of sodium and ammonium, will hinder, but not quite prevent, the coagulation of gelatine. A solution of gelatine which has been coagulated by chromic acid and dried in the dark cannot be dissolved by hot water; it loses also partially its power of distension in cold water. On the other hand, gelatine treated with the chromates and dried in the dark, remains soluble in hot water. The trichromate of potassium acts like a mixture of chromic acid and potassium bichromate; it renders the gelatine insoluble in hot water, without removing the property of distension.

Provided the potassium bichromate has not been added to the gelatine in too large a proportion, it forms with the latter, in drying, a transparent layer without any sign of crystallization; but if too much should have been used, the salt will crystallize in dentrites, and spoil the gelatine for photographic purposes. It therefore becomes an object of great importance to the photographer to know what is the maximum quantity of bichromate which the gelatine can contain without fear of the latter's crystallizing. According to the author, the capacity of gelatine for holding the salt varies with the quality of the former. On comparing, he found that a high-class gelatine, which is able to take up from five to ten times its weight of water, can when dry contain from three to four parts of its own weight of the salt; whereas an inferior sort, which can absorb from three to six times its weight of water, is able to hold only two parts of its own weight of the salt without showing signs of crystallization after drying.

The above results are found to be true in the case of glass plates coated with bichromatised gelatine and dried in the open air at a temperature of from 20° to 25° C. Under the same circumstances about one-third to one-fourth its weight more of the ammonium bichromate can be added to the gelatine, without crystallizing, than of the potassium bichromate, probably because the former salt is more soluble and less liable to crystallize than the latter.

This property of the ammonium salt is of great importance in a printing process, when it is an object to have the gelatine as highly chromatised as possible.

Glass plates coated with gelatine, and dried in a current of air of from 40° to 50° C., can take up nearly double the amount of that above stated as the maximum quantity of potassium bichromate, without having reason to anticipate crystallization; this is due to the effect of quick drying at a higher temperature.

When the chromatised gelatine is laid on sheets of paper, the circumstances will be altered, because the paper, by reason of its being porous, will itself take up some of the chromate solution, and so deprive the gelatine; at the same time, the evaporation of the water is materially increased. When paper has to be coated with the mixture of gelatine and potassium bichromate, the latter can amount to six or seven of the former without any fear of the formation of crystals.

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ON BLEACHING SHELLAC.

BY JOSEF MARIA EDER.

The greater part of the colorless shellac which is used is bleached in the alcohol solution, because these varnishes give a good polish, and warrant that the metallic articles covered with them will remain bright. There are, however, in the market considerable quantities of solid bleached shellac, and its practical preparation is not unimportant.

The method of bleaching with alcohol and chloride of lime, given by Field in the *Polytechnisches Notizblatt* (1852, ii. p. 23), and by Wittstein in *Dingler's Journal* (1857, cxiii 467), as well as those of Lunning and Elsner, with alcoho,l and animal charcoal, are not applicable to solid shellac, owing to the high price of alcohol and the difficulty of its recovery. Kressler's method is more practical, in which the shellac is dissolved in aqueous soda solution, and bleached with hypochlorite of soda. Sauerwein modified Kressler's process by the addition of sulphite of soda to the above named reagents.

According to my experiments, the following process is practically especially to be recommended, and can also be carried out on a large scale, according to my directions.

Ten parts of pulverized shellac is dissolved with four parts of crystallized soda in 120 to 150 parts of hot water in a copper kettle, and the violet solution, the colour of which is due, according to Marquart and Nees Von Esenbeck, to a colouring substance similar to carmine, is filtered through linen into a wooden vat. Ten parts of chloride of lime (containing about 30 per cent. chlorine) is triturated with a solution of 10 to 20 parts of crystallized soda in 200 of water, and this bleaching solution filtered into the shellac solution. To the mixture when cold, dilute hydrochloric acid is added carefully until some shellac begins to separate in crumbs: in most cases only a very little acid is required. This little dodge, suggested by Sauerwein, in fact, hastens the bleaching in no small degree. After two or three days, whether the solution is kept in the dark or in the light, the bleaching is finished. The shellac is then precipitated by the addition of concentrated hydrochloric acid.

If a comparatively pure natural shellac is to be bleached, this white crumbly precipitate is at once collected upon coarse linen, thoroughly washed with frequent stirring, and then melted together. Impure shellac is left standing for several hours in the liquid, after having been precipitated with hydrochloric acid. The liberated chlorine acts very energetically; yet it is preferable to allow the bleaching to proceed in the alkaline solution. The finely divided shellac, if it remains very long in the acid chlorine solution, becomes brittle, and cannot be drawn out so well. Inferior grades of bleached shellac are obtained by using half the quantity of chloride of lime above prescribed.

The precipitated shellac is put into boiling water, when it becomes soft, and can be moulded in any desired form. At first it is porous and not transparent, but repeated warming, and strong kneading and pulling, impart to it a beautiful silky gloss. In spite of the greatest cleanliness, which is absolutely necessary, it is scarcely possible to prevent the surface becoming yellowish; if the bleaching did not succeed perfectly, the whole mass has a yellowish shade. To improve the appearance of the ware, the drawn and moulded shellac is put for some twenty-four hours in the acid chlorine liquid, from which the precipitated shellac has been strained out. It is used before being diluted by the wash water; if necessary, some more chloride of lime is added. By this means a chalk white surface is obtained. This white layer also possesses this advantage, that the shellac can be kept a long time without changing its appearance; for it does not change, as all bleached shellac will, and that, too, throughout the whole mass. Finally, the silky lustre is greatly enhanced by brushing the surface. This silky appearance cannot be obtained by chemical means. According to Berzelius, by a short immersion in strong ammonia the surface swells, and when dry has a strong lustre, but instead of being silky it is resinous. The white colour of product changes under this treatment to yellowish, and cannot be restored by the above mentioned process of after-bleaching.

The shellac thus prepared dissolves rapidly in alcohol, and the solution is perfectly colourless. Previous swelling of the shellac in ether is superfluous. With freshly bleached shellac a milky turbid varnish is frequently obtained, which does not clear on standing a long time, as observed by Jacobsen and Peltz. The cause of this is the insolubility in alcohol of a resin which is contaminated in the crude shellac, as shown by Unverdorben (*Pogg. Annalen*, xiv, 119), and by the wax in the shellac (*Ann. Pharm.*, cxxxi, 286). The method proposed by Peltz, of extracting this substance with petroleum ether, I do not consider commendable, for the reason that such varnish dries brittle.

Shaking the solution with pulverized chalk, or gypsum, accomplishes the clarification in a few hours, and the clear solution can readily be drawn off. Polish prepared with such bleached shellac is more brittle than if it is bleached with spodium, and hence the latter is to be preferred for fine cabinet work. On the other hand, if the shellac is only sufficiently washed, there is absolutely no rusting of metals varnished with it.—*Dingler's Journal.*

THE TRIPLEXICON.

At the Inventors' Institute, at the offices in St. Martin's Place, Mr. W. C. Hughes, Optician, 151, Hoxton Street, London, recently gave a lecture on "Lighting Public Places and Magic Lanterns," for the purpose of introducing his newly-invented patent Triplexicon Lamp.

Sir Antonio Brady, President of the Institute, occupied the chair. In introducing the lecturer the chairman said that he thought the subject would be interesting, especially when they remembered that if they could get cheaper and better magic lanterns, for which the lecturer's invention was particularly adapted, they would be rendering a great service to the cause of education in schools. He (Sir Antonio Brady) had found that in schools magic lanterns were great educators, and enabled the teachers to instruct children, especially in natural history, much better than they could do without such aid.

Mr. W. C. Hughes then gave a brief historical account of lighting by lamps. He went on to explain how, many centuries back, what crude ideas were set forth as to means of illumination, and how of late years, when men became more intellectual and scientific, the progress that had been made in this direction. He then exhibited several modern paraffin lamps in comparison with his own invention, the Triplexicon, which was considered more dazzling and brilliant than any of its predecessors. Of these satisfactory experiments were made—comparative trials in the magic lantern were given side by side with some of the latest productions of paraffin duplex lights as used in magic lanterns previous to the Triplexicon. The test was made on a ten feet screen. He, during the trial, explained the difficulty that often arose in the duplex lantern on the sciopticon principle; of the glass plate or plates that formed either end of the combustion chambers which covered the two flames; of their liability to crack under the heat, which would spoil the effect of an exhibition, which was really verified by the fact of one of the glass plates cracking during the trial in one of the above-mentioned duplex lanterns, and which caused considerable delay. He then showed the advantage of his arrangement of the annealed glass chambers and cap that covered the Triplexicon wicks, that, although the burning edges of his wicks was twice the width of the others, yet these chambers would resist the heat brought to bear upon them, and allow the hot air to escape more readily into the room, and so keep the lantern body itself cooler. This was thoroughly proved by the fact of his lantern burning for over one and a half hours afterwards during the exhibition of pictures. Another duplex wick lantern having been set up, the various discs were shown, when that of the Triplexicon came out in bold relief, and was received with much applause.

A discussion took place as to the relative merits of the various lights, to which Mr. Hughes replied.

The Chairman, in passing a vote of thanks to the lecturer, expressed himself highly gratified at the result, and said that the disc produced by the Triplexicon Light came little less than that of the oxy-hydrogen. He wished Mr. Hughes every success, and trusted that his invention would meet with every encouragement.

J. H. Varley, Esq., Ch.E.C., in seconding the vote of thanks, quite concurred in the remarks of the chairman, because he was acquainted somewhat with the technicalities of lamps, and knew how many failures had arisen in experiments with a view to perfection in combustion o flamps having from one to five wicks. He felt sure that Mr. Hughes must have laboured hard to obtain the result he had. He could not fail to compliment him on his invention, and felt sure that he would reap the reward he deserved. The magic-lantern had become now a very popular instrument, and hitherto very poor effects had been produced by the then existing oil lights; but now certainly the Triplexicon Light was all that could be desired. He wished Mr. Hughes every success.

After a cordial vote of thanks to the chairman the proceedings terminated, those present being unanimous in their expressions of approval as to the brilliancy of the light. Among the audience were several lantern manufacturers and scientific gentlemen.

ON THE LIGHT ADMISSIBLE FOR PREPARING AND DEVELOPING PLATES.

The quantity and kind of light that is allowable in the preparation and development of dry plates is a subject which is of the greatest importance, and yet regarding which but very little care is usually taken. For wet plate photography, or when silver bromo-iodide or iodide is employed, the requirements are not difficult, though often neglected. In some dark rooms the ordinary flashed yellow glass is employed, and for certain work this is all very well, as it gives a subsequent and preliminary access to actinic light, which, as has been shown, is valuable in diminishing exposure in the camera. For plates prepared with these salts in which the exposure to this coloured light is likely to be at all prolonged, this kind of glass is objectionable and conducive to fog. In this case is to be recommended a deep orange glass, which is called stained red. The light passing through it is of an orange tint, and not so deceptive to the eye as that which passes through flashed ruby. Paper dyed with aurine may be pasted over the ordinary yellow glass before mentioned, or the dye may be dissolved in varnish and applied, and this will be equally as effective as the stained red glass. For silver bromide emulsion much greater care is required in selection, since it is sensitive to a greater or less degree to the red rays. In this case the quantity of light is as important as the quality; more particularly when compounds are present which are sensitive to the ultra red, as is the case in some of the new emulsions. In this case, if the dark room is to be lighted from the sky, the glass must be of flashed ruby, and even this must be carefully selected. In examining most of this kind of glass by the spectroscope with a wide slit, it will be found that though the yellow is absorbed, yet a portion of the green light will be transmitted, and this is absolutely fatal to freedom from fog where a very sensitive emulsion is being manipulated. The ruby glass selected should show an absolute absorption of all rays but the red, and the amount of light admitted should be but small—in fact, only just sufficient to see the image. Perhaps the best light for these plates is artificial light—either a candle or gaslight—screened from the plate by a coloured globe or stained paper.

For a covering of a globe there is nothing better than aurine and varnish, and aniline scarlet and varnish. One surface is covered with the one, and the other with the other. The light penetrating through the two will be strongly coloured. If such a light be placed six feet away from the operator all danger of fog will be eliminated. For suppose that to get a transparency half a second is required at six inches distance from the naked flame, then we should require 144 half seconds, or 72 seconds, at six feet, to get the same result. When the most intense part of the rays are cut off we may say that it would require at least twenty times that exposure to get a perfect positive, or, roughly speaking, half an hour's exposure. It will be manifest that exposure to such a light for the short time required for the preparation or development of the plate will practically have no effect on the film, since, when moistened with the developer, it becomes much more insensitive than in its dry state.—*Photographic Journal.*

The Photographic News.

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ANSWERS TO CORRESPONDENTS.

There is probably no more interesting and useful part of a technical journal than that devoted to Editorial answers to correspondents. To the tyro, first encountering the multitude of minor difficulties of which instruction books rarely treat; to the experimentalist, meeting with reactions other than those legitimately expected; at times to the skilled worker, who is called upon to undertake something outside the range of his experience—the appeal to an authority whose training has given him comprehensive knowledge, and experience, is often of the highest value. The task of answering such queries is a very responsible one, requiring, besides extensive reading and large experience in the studio and laboratory, considerable tact and patience. Our aim in the present brief article is to point out how correspondents may serve their own ends, and materially aid the writer of such answers, by a little consideration, the lack of which, at times, causes trouble and disappointment.

It is a matter of primary importance to avoid mixing business and editorial communications. Orders for copies of the paper, instructions regarding advertisements, or questions of any kind for the publisher, should not be sent in letters containing questions for the Editor. Neglect of this obviously necessary rule always causes delay, and often risks the entire neglect of part of the letter. If the letter reach the Editor's hands, he must detain it until he has answered the questions, and as one day in the week is devoted to that duty, all letters containing queries are placed aside until that day, and hence some days elapse before the letter can be placed in the publishers' hands, and the delay always increases the chances of the letter being overlooked. Another point of some importance may be mentioned here. Many readers of journals and newspapers seem to be under the impression that all communications of every kind should be addressed to the Editor. Hence orders for copies of the paper, communications regarding advertisements, and other matters of purely business character are addressed to the Editor. This inevitably causes delay sometimes for a few days, causing much inconvenience to the correspondent, who not unfrequently attributes the delay to neglect. The Editor's duty and interest are confined solely to the literary columns; neither the advertisement department, nor the distribution of copies of the paper, comes under his attention.

Another important point, to which too little care is frequently given by correspondents, is the clear statement of the matter upon which advice is desired. Too frequently the case is only half stated: a hasty summary of some of the fcats is given, but not of all, those omitted often being those most important. The writer too frequently assumes that the Editor is partly familiar with the case upon which he is questioned, although he may never have heard of it before. Another neglect consists in asking questions about some process which appeared in your pages "some time ago," without giving date or page for reference. In all such cases a specific reference should be given to facilitate answering. One of the least excusable errors of correspondents consists in hasty and illegible writing, which, referring to unusual troubles, renders a satisfactory answer all but impossible. Still worst is the occasional use of dirty odd scraps of paper, making bad writing simply undecipherable. The use of post cards for stating difficulties is very objectionable. The small space tempts the writer into brevity and ambiguity, and they are more easily lost or mislaid than letters. Questions clearly written on a decent sheet of paper, each subject numbered when there are several, are most certain to receive prompt and satisfactory attention.

Another form of neglect on the part of querists is often troublesome. They ask the Editor to supply them with information already within their own reach, giving him the trouble of searching up or referring to an authority to which they should themselves have referred. "Will you tell me the proportions to be used in Smith's process, which appeared in your pages a few months ago. I forget the precise details, and have not time to search the process up." This is a type of question we not unfrequently receive, and generally answer; but it is obviously unfair to be called upon to do so. Another class of correspondents so far mistake the real function of Answers to Correspondents, that they do not hesitate to ask to be taught anything which they do not know. "Will you please tell me how to produce an enlargement"? Or, "Will you tell me how to produce transparencies for the lantern." In such cases we have pleasure in referring the correspondents to an article in which the desired information is contained; but it is obvious that we cannot repeat full instructions for a process to meet the necessities of one reader, who may find the information already in print. Another class of correspondents not unfrequently ask what will take place under such and such circumstances, which can only be ascertained by a trial which they themselves should make; such as, "What will be the result if I only add half the quantity of alcohol given in Brown's formula?" The obvious answer is "Try!"

Another class of querists with whom we have always great sympathy, as they are generally very much in earnest in their work, send us examples of collodion, silver solution, &c., and ask us to try them and give a report upon their quality; or they will send a filtrate, and ask for an analysis. A little thought would suggest to them that they ask for the devotion of a large amount of time which could not with justice or profit be devoted to such work. In like manner many correspondents ask for replies by post, a request so obviously unfair and unreasonable, that we prefer to pass it without comment.

Another class of correspondents frequently ask very natural questions, which we feel regret in being unable to answer. They ask advice to aid them in the selection of lenses, apparatus, or material generally. That it would be invidious, and a practice open to much abuse, if we recommended by name special makers or special articles, must be obvious to everyone on a little consideration. The special recommendation of one maker, under any circumstances, is apt to rouse the bitterness of other makers; but the special recommendation, by public mention of his name, of one manufacturer, is apt to produce special bitterness, and to be regarded as gross unfairness. In answering the questions of individuals, we aim, as a rule, to make the answers instructive to others. But here we are compelled to abandon that aim. We ask correspondents in such cases to attach to each article or maker's name a figure or letter to which we can refer in answering, which will be understood by the querist, and by no one else. We can thus give the advice desired without making the invidious distinction involved in recommending or condemning a special article by name.

Finally, there is an error which some correspondents commit, which compels us to disappoint them. They write late in the week, their letters reaching us just as the paper is going to press, and ask especially to receive an answer in the current number. We are compelled to disappoint such correspondents. We cannot delay the whole machinery of a printing-office to compensate for the habit of procrastination to which the late sending of such letters is generally due. Letters to be answered the same week should reach our office on Tuesday evening or Wednesday morning at latest; and those legibly written on decent paper, and clearly stated, will generally receive the best answer in our power in the next issued number of the Photographic News.

ART EDUCATION FOR PHOTOGRAPHERS.

BY G. N. HAMPTON.

Photography in its earliest days, concerned solely with investigating the changes produced by the action of light upon certain metallic and organic compounds, might well be termed simply a science; but later on, when seeking to put their chemical discoveries to some practical use, and having for that purpose called to their aid the science of optics, photographers succeeded in producing upon various substances the image of any object, with an exactness of representation excelling the greatest efforts of the pencil, then art, allying itself to the new science, impressed into its service crucible and retort, and camera and lens, and photography thenceforth became the art science.

In this new character photography made such progress, and its productions became so popular, that a society devoted to the promotion of its interests was eventually inaugurated under the auspices of the greatest historical and portrait painter of the day, Sir Charles Eastlake, the then President of the Royal Academy; thus, as we are pleased to consider it, ratifying the alliance of photographic science with art. However, since that successful *debut*, as it may be termed, of the art science, those who, for the past quarter of a century, have watched the career of the art side of photography see around them but few of those beautiful artistic productions which its capabilities justify them in expecting. In a few words, although art is the very *raison d'etre* of photography, and photographers, therefore, should be, before everything else, artists, it is nevertheless too evident that—speaking generally—they have very much neglected art education. Under these circumstances, then, a few brief suggestions upon the subject may be interesting to such of your readers as recognize its importance.

Photographers, we have said, should be, first of all, artists, and, we add, in order to become such they must study, for art, it must be remembered, does not come, as some suppose, entirely by inspiration; and though a man may possess artistic perceptions, he is not, in the true sense of the word, an artist until, by mastering the technicalities of some one art, he acquire the power of giving form to his conceptions, and cause them to exist in the shape of a musical composition, a poem, a piece of sculpture, a picture, or some other work.

Now, in the first place, because photography is connected with pictorial art, of which drawing has been called the A B C, the photographer's art studies should embrace a course of drawing—such, for instance, as can be obtained in the Government Schools of Art, now established in almost every provincial town throughout the kingdom. Next, the student should obtain at least some elementary knowledge of perspective, and gain an insight of the principles of composition and chiaroscuro; and in addition thereto, although—except in colouring photographs—the photographer's work is chiefly confined to monochrome, still he may study the laws of colour with advantage, and, if only to acquire brush practice, learn something of painting too. Nor should the student disregard the fact that the further he can pursue his studies at the School of Art the more successful will he become in his profession.

Besides following such a course of instruction at a school of art, or a similar one under a private professor, the photographer will find it advantageous to study the works of the great masters of painting. In the case of portraits and historical and *genre* pictures, he should pay particular attention to the mode of lighting, the treatment of the subject, the character and arrangement of backgrounds and accessories, and such like points; while in landscapes he should study the picture as a whole, and endeavour to see in it that especial beauty which the artist saw and felt when moved to produce it upon his canvas.

Lastly, the meetings, *conversazioni*, and exhibitions of the photographic societies, also lectures upon art subjects, and art literature, should not be neglected. Indeed, not only should such be included in the course of early art studies, but they should be a constant source of interesting instruction to the photographer throughout his life, for the true artist is ever a student.

PHOTOGRAPHIC PRINTING PROCESSES IN THE SERVICE OF THE PORTUGUESE GOVERNMENT.

BY JOSE JULIO RODRIGUES.[*]

3. *Photolithography by Means of Sheets of Tinfoil.*—Exposing the prepared stone under the negative seldom gives satisfactory results, because it is so difficult to obtain the intimate contact of two such rigid bodies. Coating it with paper will not do, because the paper, particularly in a damp state, is too soft, and contracts unequally. Having experimented with various substances, I find tinfoil to best answer the purpose.

A thoroughly polished and finely ground lithographic stone is first covered with a sheet of tinfoil, and burnished. Too great pressure destroys the pliancy of the metal, and renders it liable to tearing. If too smooth a stone be used, the layer of gelatine will not adhere to the foil; a too rough one alters the fineness of the surface, and causes spots to develop themselves when it passes under the rollers. The burnished sheet of tinfoil is thoroughly cleaned, and placed smoothly on a planed zinc plate (such as is used for engraving), moistened with water, care being taken that it be not creased. Should, however, creases be found, they must be removed by taking off the sheet of foil and carefully replacing it, or they may be smoothed away by pressure. Finally, the foil is pressed equally on to the plate with a very soft and yielding pad.

To clean the sheet it must be lightly rubbed with a linen cloth dipped in a ten per cent. solution of caustic soda or potash; if this be not effectual, a little whitening may be used. The caustic ley is then completely washed off, and the sensitive liquid laid on with a soft, flat brush. To prepare this liquid, we dissolve in a water bath forty grams of good gelatine in five hundred grams of water; also twenty grams of ammonium bichromate in five hundred grams of water. These two solutions must be mixed while lukewarm, and filtered through double flannel or sponge. The best gelatine to use is that which sets at a temperature of 35° C. without losing its solubility. The layer must be distributed as equally as possible, that there may be no streakiness or discontinuity; there may be no holes in the layer caused by insufficient cleaning of the foil.

So long as the chromo-gelatine is wet, work may go on by daylight, because while moist it is insensitive; when set or dry, it may only be exposed to yellow light. The zinc plate on which the sheet of foil is lying should be placed in a horizontal position, and warmed by gas or in a drying oven. When the layer of gelatine is quite dry, the foil must be lifted from the plate, and the exposure may be proceeded with; this takes place best by daylight. The sheet is laid on the negative, and a roller covered with flannel passed over it, so as to bring it into perfect contact with the glass. In this condition the negative is placed in the copying frame.

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[*] Continued from page 135.

In the sun, exposure should last from five to twelve minutes; in the shade, three times as long. If the ground of the negative is perfectly opaque the exposure may, without danger, be longer continued; but if somewhat transparent, it takes place better under diffused light, and not under the direct rays of the sun. Rolling up the picture is best done at the same time, but it can, if necessary, be put off till the next day.

The tinfoil sheet is first immersed, picture uppermost, in cold water, and then laid, while still wet, on a perfectly smooth stone. A wooden roller covered with flannel is used to press it evenly on the stone, and to squeeze out the water on its surface.

The inking is done with a lithographic roller supplied with a mixture of two parts transfer ink and one part printing ink. The composition may, within certain limits, be varied according to the temperature. No varnish, however, may be used, as that makes the ink too thin. A successful result at this point depends entirely on the skill of the workman. The roller must be very good and rather smooth; it should not hold too much ink. Inking becomes difficult when there is too much water on the plate, and also when the exposure has been too short. In that case a more greasy or thinner ink may be used, but it is perhaps better to begin again.

If the tinfoil be smeared between the lines it should be covered with a thin layer of starch paste, or a still thinner film of gum arabic, and the spots rubbed out with a soft sponge. Should that be ineffectual, they must be rubbed with gum and flannel. In this way the affinity of the ink for the printing surface is diminished, at the same time it may happen that the drawing will become faint.

Too long an exposure causes the tinfoil to take up the ink too quickly, and it becomes veiled. In this case clean the moist surface with oil of turpentine and roll up again, first covering the metal with thin gum water; a little care will produce a good result. A thick layer of chromo-gelatine will adhere in inking, and tear; on the other hand, too thin a layer veils easily.

After the picture is well supplied with ink, wash the tinfoil with water, and leave it two or three hours to dry; then roll up again with ink, wash once more, take the sheet of tinfoil off the stone, and hang up to dry. Finally, apply the picture to the stone in the usual way.

4. *Photozincography.*—In this process a reversed negative is required. A thin, well-planed plate of zinc (No. 5) is grained finely with powdered pumice, cleaned with a ley of potash or soda, and covered with a layer of the following compound:—

Gelatine	3 grams
Ammonium bichromate	1 gram
Water	100 grams

When dry, the gelatine layer must be exposed under the negative for from two to five minutes in the sun, and for three times that length of time in diffused light. It must then be rolled up with a mixture of transfer and printing ink by a leather or india-rubber roller, and laid for from two to three hours in cold water. At the end of this time going over the layer several times with a good lithographic roller develops the picture, and the excess of ink dissolves away. Afterwards place the picture in warm water, in order to dissolve the places which have not been exposed; let it drain, and then pour on the following mixture:—

Water	1 litre
Gum arabic	40 grams
Copper sulphate	2 „
Gallic acid	5 „
Nitric acid	5 decigrams

Let this dry on.

For printing, a typographic press must be used. A lithographic press is not so good, because the scraper spoils the drawing; the latter may be advantageously replaced by a felt-covered roller. The ink must be applied to the slightly moistened plate with a lithographic roller.

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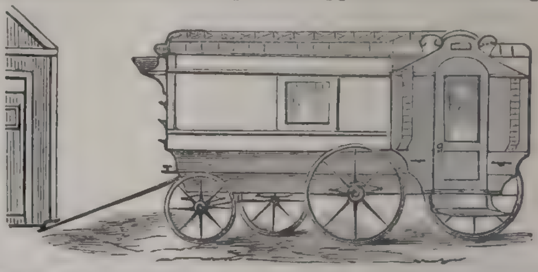
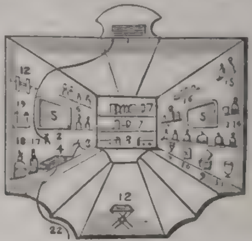
PHOTOGRAPHY AND PLEASURE.

BY J. H. CORSCADEN.

It is always desirable to make our study or business as great a pleasure as possible, for without this feeling it would be vain, indeed, to hope to succeed. The reader will, no doubt, be desirous to know how I change photography into pleasure. In the first instance, all my apparatus are of the best makers; secondly, my chemicals are as pure as I can obtain; and, thirdly, my arrangements, whether in studio or field, are of the most convenient character that can be devised.

It will be of the last-named branch of photography that I shall at present treat, and commence with my laboratory, which, by the aid of illustrations, I hope may be sufficiently clear. This laboratory is built in the form of a van or 'bus, and will convey nine persons' apparatus, and two dogs, which will be found very useful servants when in the field. No cameras can be overturned, no developer can be added to the silver bath, no negatives can be taken out of the drainer and picture craped off, or a hundred other similar annoyances that may at any moment befall you, if these noble friends of mankind form a part of your outfit. The 'bus is drawn by two horses, or three if a long journey be taken. It will be seen by the interior arrangements that all is at hand and ready for work at a moment's notice. The water supply, which is very good, is laid on over the sinks, of which there are two, one under each window, from a large but narrow tank that runs the whole length of the conveyance.





Sufficient space is left at either side, so as not to interrupt the full working of the ventilators, which is a matter of no little importance, as impure air that remains in any apartment should be got rid of as soon as possible, but more especially in that of a photographer's laboratory. The windows are furnished with plain and ruby glass, shutters, and black velvet curtains, so that all (or part) light can be shut off at will. Two operators can be at work at the same time. There is also hot-water at each sink, which is easily heated by means of a small oil stove, which stands under a flat cistern screwed to the side of the conveyance; the shelves and cupboards are filled with sockets lined with india-rubber, so that no shaking or breakage can take place, and all other apparatus are kept in position by thumb-screws. This laboratory is so like a room, that when you are within you would not suppose it to be a carriage, and that you were far from home. Here you are surrounded not merely with every convenience, but every comfort that can possibly be obtained in a photographic laboratory. And this last-named fact ought to claim the attention of those who have a great quantity of out-door work, for, with a few jolly friends, there cannot fail to be a very enjoyable and healthy day's practice.

You can return home as free from fatigue as when you set out on your journey, with boxes full of fine clean negatives, without the trouble of packing and unpacking your tent, and risk of it being blown over and all your materials broken, or so damaged as to bring your day's work to a sad close.

I have yet to mention another luxury, before I conclude, in connection with this very desirable conveyance, which will not, in all probability, be deemed the least important, namely, refreshments. At the top end of the 'bus or carriage there is a good and well-ventilated cupboard that will hold sufficient provisions to last two days if necessity should require, and by removing the apparatus, &c., from the tables, and spreading cloths, you can make yourself as comfortable as though you were at home in the dining room. Surely, with all these advantages, and the opportunity of entertaining your friends when out on a photographic campaign, I do not exaggerate when I call this photography and pleasure; and if I induce any of my photographic brethren to adopt my system of out-door photography, I shall then have gained the object I desire.

STUDIO REMINISCENCES.

A correspondent of *Anthony's Bulletin* gives some reminiscences of scenes in the studio, which may amuse our readers.

"I. She said she 'never could get a good picture, though she had tried a great many times—such horrid, ugly looking things, her friends would never put them in their albums.' She didn't care, of course, for herself, if she could only satisfy others. 'Some people never do take well, and I think I am one of them. I don't know what it is—suppose they look like me; but, somehow or other, they are not what I want to give my friends. My husband says I am expecting too much, and that I ought not to blame the artist. He says the first proofs look just like me, but I don't consider him a good judge. Now I have brought one that I had taken long since; let me see, ten or twelve years since. I don't know but it may be nearer fifteen; any way, it was before Charley was born, and he is thirteen in March. Of course the dress is out of style; but just see, Mr. Artist, the difference in the way the face is taken.' We smiled as we saw the difference, and patiently went to work to repair the ravages which time, decay, and the dentist had made in the once rotund and rosy features of our sensitive customer. 'Twas retouching did the business, and relatives and friends marvelled at its restorative power.

"'It smoothed away the lines of care,
And wrote new youth and beauty there.'

"II. Sometimes people are unreasonable. We had done our level best to photograph an ambrotype, all that was left to the memory of a sainted mother. It was to be four-four, ink finish, and framed as per contract. Our work was done in time for the day of delivery, and the only surviving daughter, under whose order we executed the deed, came to procure and pay for the same. We noticed it did not seem to please her, and awaited the reason. She said it was 'not natural—didn't look as she did; never should know it was mother.' We inquired mildly if it was not a true copy of the ambrotype from which it was taken. She said, 'That may be, but nobody ever thought that resembled mother at all; and that was why I had it copied, so as to have something that would sort of look like her when she was living.'

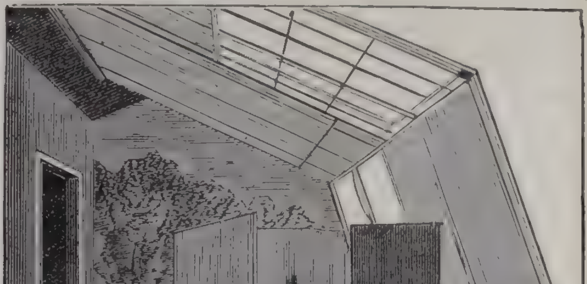
"III. He was a freshman—had never yet been 'taken.' His girl was with him, but not for a group. She 'slicked' his hair, and with loving fingers adjusted his 'tie;' then retired to the reception room till the operation was over We 'posed' him, bid him be happy, keep perfectly still, look directly here (pointing to the camera), and, removing the cap, we stepped quietly aside to await the half minute exposure. Our sitter had left his chair, and, obedient to orders, was gazing intently into the camera, his eye winkers fairly brushing a Dallmeyer that was aimed at him. When we intimated that we thought he had moved, he wanted to know if it would hurt the picture?

"IV. Among our outward signs was one indicating our ability and willingness to reproduce pictures of deceased and absent friends; and one day we were waited upon by two young women clad in the habiliments of mourning. Enquiring if we ever went out to photograph the dead, we replied, that it sometimes became our painful duty to do so, but regretted very much that so important a duty should be so neglected. 'Well, we did not think so much of it till mother died; and now that father is very low, we've thought if we could get their likenesses, it would be such a comfort.' 'Then you have no picture of your father?' we inquired. 'No; and we do not care to have his unless we can have mother's; and we would like to have you go and take it.' With a reasonable spirit of accommodation we proceeded to take the necessary directions, when we were somewhat astonished at the nature and magnitude of our labours, it appearing that the mother had been mingling with her native dust nearly nine weeks; but we were assured that as she was nothing but 'skin and bone' when entombed, it was probable no change had occurred in the serenity of her features. We tried to explain the proceeding as something a little out of our usual practice, and, having no undertaker attached to our corps of artists, we had to ask for further time; meanwhile, we made an unsuccessful plea for a picture of the father before he went hence. They would have both or none.' Verily, what shadows we are, and what shadows we pursue."

AN EFFECTIVE STUDIO.

Our Philadelphia contemporary gives the following details of the studio of a skilful and artistic photographer, Mr. Landy, of Cincinatti, Ohio, from which many of our readers will obtain useful hints:—

"The dimensions of this studio are as follows:—Length, 40 feet; width, 25 feet; top and side-light, each 12 feet wide. The side-light reaches to within 2 feet 6 inches of the floor, and stands at an angle of about 25°, and and is 10 feet high. The top-light is 20 feet long, and inclined at an angle of 40°, as shown in the cut. A very good model, no doubt!



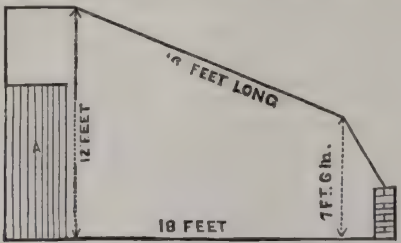
"In speaking of his formula, Mr. Landy says:—'The formula I work is the same as you have so often published, and which I have used for thirteen years or more.

Collodion.

Powers and Weightman's ether ...	1 ounce
Alcohol, 95 per cent.	1 ,,
Iodide of ammonium	5 grains
Bromide of potassium	2 ,,
Anthony's cotton	4 ,,

"'I also have a solution with the above proportion of iodide and bromide, without cotton, for thinning in hot weather. I also have a strongly-iodized solution for certain kinds of work. My bath is generally from 35 to 45 grains strong. Strong effects of light require very weak iodizing; formulæ are played out. After making a few batches of collodion, you will soon see what's wanting. I believe in cultivating the eye, so that you can tell when you have a good effect without trying a plate to see if the shade is too deep, or the light too strong. Brains!'

"In addition to this, Mr. Landy says, in a recent letter: —'I find I have nothing new to offer you, therefore deem it useless to repeat what you have published before, since you have the drawing of my skylight and my formula, all of which are about the same as you have printed from time to time. The only change I have made is my light, which is now much lower, and I consider it a great improvement. The dimensions are as follows: 12 feet wide, with the balance the same as diagram shown; and with the aid of curtains I manage to obtain very satisfactory effects of light and shade. I have a space provided at the end of my room, as you will observe in the second diagram, which is used to store backgrounds. Each background is supplied with a pair of trunk wheels to enable me to run them in grooves, and a large number can be stored away in a very small space, and, with one pair of Seavey's background attachments, is all that is required for any number of backgrounds. Such an arrangement as this, of course, makes it necessary to have a much wider room than usual; but its convenience is undoubtedly very great.'"



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HOW TO MAKE A PHOTOGRAPHIC PRINT UPON PAPER IN FIVE MINUTES.*

It is sometimes desirable to produce a positive upon paper in much less time than is possible by the ordinary process, in which manner it takes not less than twelve hours to complete a good photograph. We believe, therefore, that the following process will be taken up with some interest.

The following solution is prepared in a stoppered bottle, and protected against light:—

Distilled water...	500 grammes
Citric acid	30 ,,
Citrate iron and ammonia ...	15 ,,
Conc. liq. ammonia	30 c.c.

After shaking the bottle until everything is dissolved, the solution is filtered.

Now fasten a piece of positive paper with clamps upon an even board, and cover the same with the above solution, applying a flat camel's hair brush up and down the paper until it is evenly coated, after which manipulation it should be dried in the dark.

The paper prepared in this manner will have a deep yellow tone. The printing is done, as usual, in a printing-frame; but care must be taken that the action of the light commences simultaneously with the copying. The exposure should be very short, and continue only until the principal lines of the picture are visible. After this the picture is placed in a flat dish, the exposed side up, and then moistened with distilled water, when the following developer is to be poured upon it:—

Distilled water	500 grammes
Cryst. nit. silver	16 ,,
Conc. liq. ammonia	8 c.c.

This solution must be filtered, and will, after application, bring out all the details of the picture, but with a disagreeable, red tone. (This developing solution, by shutting off the light, can be kept for a long time, and, by filtering again when wanted, can be used repeatedly.) Afterwards the picture is carefully washed in running water, and fixed in the following bath:—

Distilled water	500 grammes
Hyposulph. soda	30 ,,
Aqua regia	10 ,,

In this bath the picture remains several minutes, until it has changed to a deep purple tone, after which it is put into a dish with warm water, and washed, and then rinsed three or four times in a change of water. Now it is placed between a few sheets of blotting-paper, and then dried over a spirit lamp. According to the quantity of aqua regia and hyposulph. soda in the fixing bath, the tone can be changed. The tone can likewise be modified by adding a little pyrogallic acid. This copying process can be also used for enlargements.

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THE COLOURS OF THE SPECTRUM IN THEIR RELATION TO PHOTOGRAPHY.

BY ERNST DUBY.*

On the 7th March last I delivered to the Photographic Association of Berlin a lecture, with experimental demonstration, on spectrum analysis and its applications, and endeavoured on that occasion to introduce my hearers into the domain of a science which, though comparatively of recent origin, has already acquired for itself a position of the highest importance. The limited time at my disposal prevented me from enlarging at any length on a branch of the subject which is of the greatest possible value to photography.

In Joseph Albert's beautiful heliochromes we have so brilliant a testimony to the possibility of photographing colours previously thought to have no actinic action, that it seems inexplicable why similar attempts, whose results could not fail to be of immense importance in photographic practice, have not been more generally undertaken. Experiments on the actinism of the several colours of the spectrum have often been made; we look forward with hope that the coming spring and summer may be propitious, and give us many bright and sunny days, when we may be able to confirm and complete former discoveries.

Dr. W. Zenker, who, even before the year 1868, had commenced his researches in chromo-photography, has published a pamphlet in which he states the following theorems:—1. Chloride of silver—and especially the violet chloride—shows identically the same colours as those of the rays of light which act on it, and those colours are manifested both by reflected and transmitted light. 2. So also silver bromide, and chlorinized gum giuacum, show the same colours, while silver iodide shows the complementary colours. 3. The several colours are not shown throughout with the same intensity. 4. In taking pictures, the invisible rays must be stopped out or absorbed, in order to avoid an interfering action. 5. Still greater efficacy can be communicated to silver chloride by heating it, by exposure, or by chemically sensitizing it 6. The pictures or images have not as yet proved capable of being fixed. 7. Physically, the action is explained by the interference of the waves of light, chemically by the separation of particles of metallic silver from the chloride.

(To be continued.)

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* *Anthony's Photographic Bulletin.*

* *Photographisches Wochenblatt.*

Proceedings of Societies.

Manchester Photographic Society.

The usual monthly meeting was held at the Memorial Hall, on Thursday evening, the 11th inst., Mr. **Alfred Brothers**, F.R.A.S., President, in the chair.

After the minutes had been read and confirmed,

The **President** showed some mechanical Autotypes representing Old and New Manchester, from wet-plate negatives by himself, and also some interiors from wet plate negatives by Mr. J. Pollitt.

Mr. **Schofield** exhibited a camera tripod by Mr. Ross, a wood and glass tray, some prints from Mr. Inskip's dry plates, and a bromide of zinc emulsion transparency developed with Newton's developer.

Mr. **Wigglesworth** showed some results of his experience with Liverpool dry plates.

Mr. J. W. **Leigh** introduced a camera tripod made of bamboo-canes, and explained how one of the legs could be utilized as a fishing-rod. This tripod was both light and firm.

Mr. J. **Holding** again alluded to burnt-in pictures on wood, but nothing new was elicited.

A vote of thanks was passed to the exhibitors, and the meeting was adjourned. C. **Adin**, Hon. Sec.

Photographic Section of the American Institute.

A **meeting** was held on February 5th, President H. J. **Newton** in the chair.

The minutes of the last meeting were read, and, subject to some corrections to be made on motion, were approved.

The **Secretary** said: In a German journal, published by the editor of the *Year-Book*, is a blank form, the headings of which I have translated. It seems to be a sheet which is circulated in Germany, where they have, as I understand, something like a Photographic Union. Here is one of the blanks. They seem to have their head-quarters for information; if a firm wants to employ an assistant, it can send to this place and find out the standing of a man, when and where born, whether married, moral character, usefulness, ability, how long in business, why discharged from last place, and any other remarks.

It was moved, &c., that the usual vote of thanks to the editors of said journals be entered on the minutes.

Dr. **Higgins**: Mr. Newton, at our last meeting, exhibited a certain negative, in taking which he placed in opposition with the print copied a piece of glass, one half of which was tinted slightly with blue aniline, I believe. The negative showed no distinction; the two halves seemed exactly alike. Mr. Chapman thought, at the time, that the intensity of the blue was not sufficient to make it an *experimentum crucis*. Since that meeting I have tried the same experiment in a somewhat different manner—in a manner that, I think, will be pretty conclusive, from the intensity of the blue glass I used, an intensity far greater than probably ever would be made use of—the ordinary blue glass which has been the mania for a long time, pure cobalt, and of very great intensity, that is, as far as photographic use would go. In that shield [exhibiting] I placed two pieces of glass of the same thickness by careful microscopic measurement, one white and the other blue. I then placed in the shield a sensitized plate, and exposed to the gaslight. The result is here shown. The upper half has one-half the exposure of the lower. The right hand is the clear glass; the left the other. They are marked. It will be seen that with that intensity of blue, the injury—or decrease in sensitiveness, rather—is about one-half, especially if the two corners which are marked with a jog taken out are compared, as the exposure of one is exactly double that of the other. The right hand is the white glass, the same as in the shield, half exposure—ten seconds on that, twenty seconds on this (the blue). When exposed, an obscuring medium was placed over the glass in that way [illustrating]. I pursued the experiment in the same way with a negative in copying by gaslight, thinking that possibly, and very probably, the yellowness of the gaslight mixed with the blue glass in the shield would, as it naturally would do, give a green character to the light passing through. I then exposed a plate in the camera by daylight, and the result is here shown [exhibiting]. The square in the centre of that plate is simply a piece of card, to see that my emulsion was working clearly. That was directed to simply a white sheet hung up in the room; it does not show quite so much difference by daylight as by gaslight. That plate also shows the loss of power which results when a portrait lens, as that was, is used upon a plate that was focussed upon a white sheet. A curious result occurred in the taking of a further picture. I separated the two pieces of glass in this shield, leaving a half-inch or thereabouts between them, so that there should be no glass interposed between the object taken with the camera in the daytime and the negative. The result is very marked, showing the loss of intensity when the light passes through a glass. It is often said that portraiture, or work inside the room, is so much slower than outside work. May it not be that the light has to come through the glass with which the room is roofed, and that, if those roofs were sliding, we should have the same quickness as we would have outside? I think, also, that that last plate shows how much the thickness of the glass in lenses has to do with their responding quickly to the action of light. I think that would satisfy Mr. Chapman.

The **President**: He would argue that there would be a difference; that the ratios would diminish with the depth of colour. My experiments were made mainly to see if Mr. Chisholm's conclusions were correct, as he was strongly impressed with the idea that he got quicker results with the blue—but it was a very delicate light blue that he procured in this city; so that in making my glass I only aimed to get just sufficient blue to change definitely the colours under the blue, making the yellows green, the reds purple, and the browns a deeper or colder brown. That was all that I aimed at. I felt very confident that blue of that depth would be a very serious impediment in the force of actinism in the solar ray. I think that Dr. Higgins' experiment is conclusive as to the retarding influence of the blue of that degree of intensity.

Dr. **Higgins**: And, to follow it up, there can be no such thing as acceleration by blueing the light.

The **President**: That is the ground that I have always taken. I stated that unless it could be shown that there existed in the solar ray a retarding influence which was filtered out by the use of a blue medium, there was no foundation in theory even that acceleration was possible in the use of blue light; for all the actinism in the solar ray is contained in white light.

Dr. **Higgins**: In taking these negatives I had to make a special emulsion, to work exceedingly slow. In using my ordinary emulsion (I don't know whether it is slow or rapid; usually an exposure of two seconds is a full exposure with it), I found it very difficult to not over-expose it, and then the difference was not so marked, by any means. Therefore I made a very slow emulsion, with which I could expose ten, up to twenty seconds, without over-exposing; then the difference between the two was easily discerned, but with a sensitive emulsion it was not so conspicuous.

The **Secretary**: For several reasons I do not consider the experiment so critical a test as the one the President made. One reason is, here are two pieces of glass not identical, one blue, the other clear; it may have a greenish tint or a yellowish tint, if examined critically. If you could take the blue out of this blue glass, we don't know what we would have left. There may be a green or yellow tint mixed with the blue, but the blue preponderating to such an extent that it obscures the other colour. In experiments requiring such delicacy in order to arrive at a certain and satisfactory conclusion, I think it necessary that all those points should be carefully considered. Ten or twelve years ago I put in my studio a window glass similar to this; and then I changed it for a much lighter blue, and found the difference very marked. These experiments led me to the conclusion that properly constructed blue glass, having the proper amount of blue on or in a proper body of otherwise colourless glass, was really an advantage. I actually believe that it does not retard the actinic force at all; and I yet believe that if Dr. Higgins will go into such a series of experiments as he is capable of carrying out, he will find the blue glass has some virtue in it.

The **President**: The glass that I used was a sheet of eight by ten inches, very thin—I don't believe it was a thirty-two-second part of an inch in thickness—and that would account, probably, for there being no perceptible difference between the part covered with the glass and that not; in my experiments, I am inclined to think that where the glass is immediately in contact, pressed upon the object being copied, the difference would not be as perceptible as if placed in this position.

Dr. **Higgins**: There is no doubt that the thickness of the glass would have to do with the result. In my case it is quite a heavy glass, a thick piece of ordinary negative. In the President's case he used very thin glass, and the result would not be as perceptible. Again, the light going through the lens, all the rays of light that struck the picture perpendicularly to itself would not suffer refraction; only those striking it obliquely. Light, in striking perpendicularly upon a medium, passes through without refraction; but if it strike it in the least obliquely, then it will become refracted. In my case the absence of glass here in the central part of the plate is seen, so that the presence or the absence of it would have no effect, so far as refraction of the rays would go. In the President's case it would have great effect, by reason of its object being inclined at an angle.

To be continued.

Talk in the Studio.

Collodion Transfers.—We are favoured by Mr. R. Stuart, of Chiswick, with an example of enlargement on collodion transferred to paper. It is marvellously delicate, brilliant, and satisfactory. For the portraitist with few facilities for enlargement, this is without question the simplest and most efficient. The example before us is so excellent as to cause regret that the process is so little used.

The Late Mr. Fox Talbot.—At Tuesday night's meeting of the Society of Biblical Archæology, held at its rooms, 9, Conduit Street, W., the president, Dr. S. Birch, of the British Museum, in the chair, Mr. R. Cull, F.S.A., read a "Memoir of the late H. Fox Talbot, F.R.S." Nothing need be said of the account given of Mr. Talbot's parentage, birth, school, and college days, nor of the culmination of his long continued study of optics and chemistry in the brilliant invention of photography. His career as a philologist is less generally known, and in all likelihood few are aware that he was already ardently engaged in hieroglyphical research so early as 1826. In a letter dated the 16th of April in that year, an abstract from which was read by Mr. Cull, M. Jules St. Quintin, Curator of the Turin Museum, which Champollion had visited shortly before, says that with the exception of that extraordinary man, he had never met anybody so deeply versed in that new branch of learning as Mr. Talbot. It was into the cuneiform investigation that he ultimately threw himself heart and soul. But the statement which has been made in a standard work that, along with Sir Henry Rawlinson and the late Dr. Hincks, he was one of the first to decipher the Ninevite inscriptions, Mr. Cull holds is a grave error. Mr. Talbot was an Assyrian scholar, but he did not enter upon the study until the value of the characters had been ascertained, and his own avowal is that he was no more than a disciple of those scholars. As the Assyrian was shown by a mass of evidence to be a member of the Semitic class of languages, to which Hebrew, Arabic, Syrian, &c., belong, much disappointment was felt that Semitic scholars did not examine that evidence and give the weight of their authority on the question. Mr. Talbot accordingly proposed an experiment to awaken attention to the validity of the basis of interpretation adopted by cuneiform scholars. He proposed that separate and independent translations should be made of the same inscription. The Royal Asiatic Society adopted his idea, and made the arrangements. The inscription of Tiglath-Pileser I., running to about a thousand lines, was pitched upon. Sir Henry Rawlinson, Dr. Hincks, Mr. Talbot, and Dr. Oppert agreed each to make a translation by a given day. A committee, consisting of the Dean of St. Paul's (Dr. Milman) as chairman, the Master of Trinity (Dr. Whewell), Mr. Grote, the Rev W. Cureton, Sir Gardner Wilkinson, and Professor Wilson, opened the sealed packets on the appointed day. They compared the several translations, not with a view to their relative excellence, but as to their substantial agreement, and from their favourable verdict dates the general recognition of Assyriology and the ever-growing confidence in its momentous revelations. Of Mr. Talbot's voluminous contributions to the science Mr. Cull gave a full account.—*Times.*

Retouching Varnish.—Dr. Vogel says, in our Philadelphia contemporary:—"A correspondent of mine, Belitzky, lately communicated a very good formula of varnish, for porous retouching:—Sandarac, 4½ parts; castor oil, 1 part; alcohol, 22 parts. To get this varnish more susceptible for retouching, Belitzky advises that the surface be rubbed with castor oil, and wiped off with blotting-paper. A known inconvenience of the pencil retouching for a large number of copies is the rubbing of it off. To avoid this, Belitzky fixes the retouching in a peculiar way. He applies a jet of alcoholic vapour. The plate is placed in an inclined position at a distance of 10 c. from the jet, until the faint retouching spots grow shiny. The retouching will then have penetrated the varnish and become fixed. The operation requires some care and practice, which can easily be got by trials with old, useless negatives. In case the jet of steam has been too long in action, the varnish becomes liquid. When that occurs all the varnish is to be taken off with alcohol of eighty-three per cent., and the plate revarnished.

To Correspondents.

Amateur.—Take three ounces of good gelatine—Nelson's opaque answers well—and dissolve in a quart of hot water; then take two ounces of bichromate of potash, and dissolve in half a pint of hot water. Then mix the two, and keep them in the dark. Apply whilst warm to transfer paper. Bank post will answer well.

K. H.—The prints forwarded have two distinct kinds of spots, which proceed, we think, from different causes. Those with a small black centre appear to proceed from metallic spots in the paper. The small pale yellow spots are more difficult to account for, although they are very common. Such spots appear at times as the result of keeping albumenized paper a long time in a damp place, and in such cases they gradually get worse as the paper grows older. Spots of a similar character sometimes arise from the formation of small bubbles on the face of the print whilst in the hyposulphite solution, and so cause minute spots of imperfect fixation. No certain conclusion as to the cause can be attained without an exhaustive examination of each individual case.

G. M.—The method given on the page to which you refer is a patented method of working on a large scale with extensive machinery, applying various salts, or gelatine and chromic salts, or salts of alumina, &c. Mr. Sutton, many years ago, patented a method of making the paper waterproof before albumenizing by applying a solution of gutta-percha. We have tried some experiments in that direction ourselves, and have come to the conclusion that any really impermeable coating on the paper spoiled its texture, and was objectionable in many ways. The safest reliance is upon a sample of hard sized paper sufficiently old to be tolerably non-absorbent. A new sample of plain paper is almost useless. It is troublesome to albumenize, and does not give good results.

J. J. T.—Printing baths vary in strength. They should bear some relation to the strength of the salting solution used in preparing the paper. We have found in practice that, as a rule, the printing bath should contain five times as much nitrate of silver as the albumenizing solution contained of a chloride (say) of sodium. Thus, if the albumenizing solution contained eight grains of salt per ounce, the nitrate bath should contain forty grains per ounce.

M. F. T.—The presence of a little nitric acid in the positive developer gives a whiter and more silvery image. An iron solution containing fifteen grains of the iron salt, fifteen minims of acetic acid, and one minim of nitric acid, in an ounce of water, will give good results. Be careful to avoid over-prolonging the development.

R. F.—The mottled, weak effect of your prints is caused by the nitrate bath being too weak. You are probably working with a small quantity which has soon become exhausted.

X.—The fuzzy want of sharpness is due to the use of a single lens not properly stopped down; it is, in fact, spherical aberration, which requires a stop to correct. All single lenses have more or less spherical aberration, which must be corrected by the use of a stop.

G. F. M.—The case you describe is, undoubtedly, a deliberate and contemplated piracy. Your difficulty of proof of the actual producer of the piracies is really of no moment. If the vendor will not help you to convict the pirate, he places himself in danger, for the Act enables you to proceed against the vendor, who will have to suffer all the penalties. Summary proceedings before a magistrate are the shortest and simplest method.

Try Hard.—It is not difficult to keep a few ferns and wild plants in pots, or, better still, in rough boxes, which may be used for foreground in pictorial portraiture in the studio. Gather the roots in your country walks. There are scores of suitable subjects. All the common ferns will answer—common docks, yarrow, nettles, and dead nettles, briars, silver weed, &c. They should be kept in the open air, and moderately watered in dry weather. When you water, give a good soaking at once, and do not be constantly applying driblets. An old tree stump, some rough stones, and some cork bark, with the wild flowers, will make an excellent foreground, if arranged with judgment. Of course, some garden flowers may be used; but those most suitable are rarely grown in pots. For instance, the hollyhock is excellent; but you cannot very well lift one from its place in the garden and bring it into the studio. Avoid the constant use of stiles, which are used up.

B. R. F.—The oyster shell stains arise from the use of a horny collodion. It will improve with age. Adding a little of a sample of old and powdery will be useful.

Several correspondents in our next.

The Photographic News, April 26, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Vanity and Art in Photographic Portraiture.

It is a pity that in photography a strict following of the canons of art, and commerical success, do not always go hand in hand, but it is none the less true. Many good artists may be pointed out among photographers who have made little way in their profession in a monetary sense; while of those who have done, or are doing, well may be cited many who do not even profess to art knowledge. They know what the public like, and are not above gratifying the vulgar mind, no matter how little art or how much of the finished or manufactured article may be in demand. An example of this kind is easy to cite. Take the case of two provincial photographers of moderate skill. The one strives to give his patrons portraits as soft, plastic, and truthful as possible, and the other's efforts are directed towards the production of bust pictures with the highest amount of glaze, with face and garments as brilliant and as burnished as possible. There is no doubt which of the two will make more money. There is a style about the finish of the latter's picture, a suggestion of "latest manufacture," which the more honest picture lacks altogether. On all hands it is proclaimed that the glazed and highly finished cartes and cabinets of the day are inartistic, and yet it is patent to all that they are favorites with the public. Rejlander used to say of such pictures: "They are very pretty, the gloss is perfect, and the enamelled card quite soft and smooth, while the nice red line all round is in keeping with the fine retouching—charming, exquisite, like a picture upon a French plum box; but it is not art." Rejlander was right, no doubt, but the French plum box pictures, nevertheless, sell better than more artistic and truthful productions.

What is the good of argument when you have to do with human vanity? It is all very well to say that vanity is a vice, and should not be pandered to; but all the preaching in the world will not put it down. Who has not heard people say of portrait-taking, that the next time they are photographed they shall go to Messrs. Bright and Burnish for their pictures? They have seen many in the shop windows, but none are equal to those taken by those gentlemen. "By Jove! don't you know, one wants to look as well as one can, and really they make everybody quite too handsome altogether." Who has not heard some beau or belle getting on in years say: "Oh! that last portrait of mine is simply frightful; let me give you one taken some years ago that is far more like. I have sent word to the photographer to look up the negative again, and to get me a few dozen printed off"? Why is the last portrait almost invariably better than the one just taken? Simply because the young lady or gentleman is getting on in years, and the picture taken five years ago appears more juvenile than that now put before them. It is vanity again cropping up. When they give you the old portrait, you are not deceived. On the face of it, you know why they like it. Only the other day a distinguished amateur friend secured half a dozen pictures of a noted surgeon—a man who has made his name in medical science, and who ranks second to none in the particular branch he has made his study. This gentleman was staying for a few days with the amateur, to whom, indeed, he had been of material assistance as a skilful surgeon. The amateur was no dabbler in the art, but one who had practised the art so long and so successfully, that he had won for himself a high place among art photographers. He did his best, and his best, we are bound to say, was very good. A bold, manly portrait was the result, which, by most people, would have been pronounced particularly satisfactory. But one after the other the portraits failed to please the model. He acknowledged his host's skill and ability, but did not care about having any copies taken off, thank you. But that the family should not be disappointed in their desire to have copies of his portrait, he would send them a few when he got back to town. He did so. They were delicately printed vignettes of a fair young man, with soft undecided whiskers. So that here was a man of the world, one who had made his mark in his profession, and who had seen forty-five summers, if not fifty, unwilling to appear as he saw himself every day in his own looking-glass. When these charming pictures were handed round, everybody knew as well as if it had been plainly printed upon them the reason why they were preferred. Everybody knew that it was personal vanity, and nothing else, which made the picture so acceptable, for they were altogether unlike the present individual. But the instance furnishes us with a very good criterion of vanity, and if photographers want to get on in this world, they cannot afford to disregard so important an item in the human total. A saying of Oliver Cromwell's is often quoted in contradiction to the theory of universal vanity, to the effect that he told his portrait painter to print him as he was—warts, wrinkles, and all. Well, we do not wish to say anything detrimental to the character of so great a man, but our own private opinion has always been that this betrayed the possession of rather more vanity than that possessed by most people. Cromwell, better than any one, knew what a revolution he had instituted in our laws, and how much he had added to our constitution, when he drove the bewigged and bepowdered Stuarts from the throne, and to him it was sweet to think how his enemies—and friends, too, for that matter—would regard his ugly features in days to come. He knew he was ill-favoured, and was vain enough to wish to appear so in his portrait, that his ugliness might be remarked upon when his great deeds were discussed. The court dandies and mincing fops gathered around the Stuarts would be all the more discomfited by having the picture of an ugly man set before them. As a rule, however, we should not advise photographers to follow the injunctions given by Cromwell to his painter. They will do much better if they err on the other side: if they make a wrinkle less distressing, and soften down a wart until it is hardly visible. Nor is it well to turn too deaf an ear to retouching and enamelling. They are, as we said before, pronounced altogether inartistic, but yet the public will buy them. Mrs. Pearce is not the only person in the world who wants to appear good-looking, but, for all that, we need not all profess to enamel like Madame Rachel. We suppose those ladies expressed the greatest contempt for the affair who were rather given to "improving" their faces. As the glass carbon prints or Lamoertype pictures demonstrate, the public are much taken with a glazed and polished surface, and in small work, little, if anything, can be said in dispraise. Enamels and ivory miniatures are considered works of art, and we cannot see why small photographs should be tabooed because they have a shining surface. In any case, as we have pointed out, there is a very good sale for these highly-finished portraits, and some of the Continental photographers, we are told, spend many pounds in the finishing of carte portraits in order to secure a name among the public for work of this kind. The New York work which has lately been so much in vogue is of this school, of which the early pioneers may be considered Reutlinger of Paris, and Fritz Luckhardt of Berlin. The moral is clear: if photographers desire something more than bread and cheese, they must not only study art, but such things as style and fashion as well.

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THE PROGRESS OF ASTRONOMICAL PHOTOGRAPHY.

Astronomical photography comprises first, the representation of the surface of celestial bodies sufficiently near to us to give a magnified image when observed with the telescope. Thus the sun with its spots and faculæ, the moon with all the details of her surface, and such large planets as Jupiter, Mars, and Saturn, have all been photographed. Secondly, it is possible to obtain by this means exact images of star groups, and thus to determine at once the relative situation of certain stars for a given epoch. By means of photography it is possible to observe, as it were automatically, passages of planets before the sun, eclipses, occultations of planets by the moon, and passages of stars at the meridian for the determination of absolute time. By its aid also we are enabled to reproduce the solar spectrum with all its lines, and to extend the limits thereof beyond the visible rays. Photographic pictures in the stereoscope also show very clearly the sphericity of the bodies represented. Lunar craters, the rings of Saturn, the spots and faculæ of the sun, there appear in high relief, and the observer is enabled to see that the faculæ are elevations, and the spots depressions.

The finest astronomical photographs have been produced by Warren de la Rue in England, the late Father Secchi in Rome, Mr. Lewis Rutherford in this city, Ellery at Melbourne, Negt at Ghent, Gould at Cordova, and Janssen at Paris. Mr. Rutherford has obtained superb views of the moon with an exposure varying from one-fourth second for full moon to two seconds for the first and last quarters. With these photographs M. Elie de Beaumont has shown how much may be deduced geologically with reference to the lunar surface, which is not affected by the destructive action of water or of any atmosphere. The comparison of photographs taken at long intervals apart also allows of the recognition of any changes which may have occurred in the lunar surface. It is now reasonably certain that active forces are at work in the moon's interior, and the disappearance some twelve years ago of a cavity which is shown on the maps of Maedler made in 1829 has educed the theory that it was filled up by an eruption of white material. This can only be verified by comparisons of photographs taken over many years.

Astronomical photography has recently, however, assumed a higher place than as a mere mode of reproduction of the images seen through the telescope. It has, in fact, become an important means of discovery, and the researches of Janssen have shown that photographic pictures reveal phenomena otherwise totally invisible. It was through such prints that he discovered the photospheric network around the sun. The great difficulty encountered in studying the solar photosphere has been to determine the exact form of the granulations or "willow leaves" which appear to form currents of semi-liquid matter. Small photographs showed little or nothing of these, and the reason is found in the phenomenon of irradiation, which causes the image formed by a very intense light to extend beyond its real boundaries, and so to assume a false form. This was especially noticeable in all photographs of total eclipses; the images of protuberances trenched on the lunar disc often to the extent of ten or twenty seconds. The same effect is produced on the eye. Now the average diameter of the granulations of the photosphere is but a second of arc, and it is therefore easy to perceive how a very small degree of irradiation suffices to confuse all the details of their form. Janssen has overcome this difficulty by enlarging the image and shortening the time of exposure. In a minute fraction of a second he obtains an image 10·8 inches in diameter. On this can be seen, first, a fine general granulation covering the solar surface. The grains, more or less rounded, have diameters varying from some tenths of a second to three or four seconds. The illuminating power of these granular elements is very unequal, doubtless because they are situated at very different depths, and those which attain maximum luminosity occupy but a very small portion of the solar surface. The most curious result, however, derived from an inspection of the photograph is that the photosphere appears divided into a multitude of compartments, having rounded or polygonal contours, the dimensions of which attain sometimes a minute or over (the diameter of the entire solar disc is about thirty-two minutes). In the intervals between these figures the grains are clear and well defined; in the interior they are half effaced, broken, and often absent. It may be supposed that in these spaces a violent commotion has mixed together or confounded the granular elements, and thus a new comfirmation is afforded of the fact that the activity of the photosphere is always very great, even when no spots are visible.

We have already fully described the apparatus used by the various expeditions for photographing the transit of Venus of 1874. It may well be asked if the immense labour spent upon the observation of that phenomenon has served to fix a value of the solar parallax more exact than that already obtained by other methods. All that is known at present is that the parallax deduced by the British Astronomer Royal from the direct observations of English astronomers (8·76″) is a little less than that determined by Professor Newcomb by taking the average of the best known results (8 85″). Examination of the photographs has further resulted in proof of the existence of an atmosphere around Venus.

Mr. Rutherfurd, of this city, has the honor of being the first to photograph the star groups, and he uses for that purpose a refracting telescope, 13-inch objective, mounted equatorially, and moved by clockwork. The duration of exposure depends upon atmospheric conditions, but about four minutes suffice for stars of the 10th magnitude. Mr. Rutherfurd has obtained very exact charts of the Pleiades, of the constellations Præsepe and Perseus, and of the stars near 61 Cygni. Gould, at the observatory of Cordova, has also achieved remarkable success in this line. Last November he possessed proofs suitable for the micrometric measurement of 84 celestial bodies, of which three-fourths were star clusters. The plate representing the cluster of Eta of the Ship showed 180 stars, many of which are of the 9th magnitude. Mr. Gould has also obtained fine photographs of the moon, Jupiter, Mars, and Saturn.—*Scientific American.*

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REVERSED NEGATIVES.

BY I. B. WEBSTER.*

Mosaics for 1878, page 124, commences an article with the above heading. I have read it carefully over several times, and have no doubt but any careful manipulator would succeed in producing good results, provided he followed the instructions there given. To be sure, there is much to be done, besides considerable time required to prepare the mixture used; but the supposition is that a sufficient quantity of each could be made in that time to last quite a while. It is not my intention to criticise this article in itself, for if I wished to accumulate a large number of negatives and prepare them to take up but little space and be safely kept and light to handle, I should make strong efforts to make a success of that very formula. It strikes me as a good thing for the economical preservation of choice negatives in large numbers. Reversed negatives are rarely desired, and can be produced in such a simple manner that I cannot see the object in resorting to so complicated a method to obtain them.

It is now many years since I was first called upon to photograph a Daguerreotype view which showed all the signs with letters reversed, as all opaque plates do when taken direct in the camera. Of course, we picture men all understand this without my explaining it. In the photograph the negative steps in between the original and the print, and turns everything back to the first position. This being true, how will we turn back on paper the reversed letters on the Daguerreotype? If we proceed in the usual way, the negative will impress upon the paper the reversed letters again. The virtue of the *Mosaics* process referred to consists of its thinness, rendering it easy to print from either side of the negative. It, however, is too complicated for the limited demand of reversed negatives, and we propose to resort to a more simple way. It can be done by placing the original in front of a mirror, so placed as to allow the camera to bear upon the reflection in that mirror, which position is not always attainable.

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* *Philadelphia Photographer.*

My brother invented an attachment, to be placed upon the hood of the tube, containing a reflector which was a perfect success in making signs read right (and cipher) upon the opaque plate. This was in 1852. We always used one of these in taking views, until the photograph was introduced. The principle that produced that effect is identical with that of the reversed negative. The most simple way to produce a reversed negative is to place the prepared plate into the shield with the coated side towards the back of the camera, thus allowing the light passing through the tube to carry the image through the prepared plate, and impress it upon the prepared surface of said plate, then the farthest from the tube.

I am prepared to hear several objections raised by some about not being able to get a good focus, or a failure to see how it is possible to hold the plate in the shield, on account of the springs upon the shutter of the shield, &c. I will meet you upon these points right at the threshold by telling you how to do it. First, how to focus. Try and select a plate about the thickness of your focussing glass (you need not be particular to a hair's breadth). Proceed to arrange for your copy just as you would for any other copy. When you come to focus, turn your ground-glass over, by taking it out of its frame and putting it back, so as to have the ground surface towards the back of the camera; then replace the frame in the camera, and proceed to draw the focus. Second, to safely carry the prepared plate in the shield. After carefully placing it in the shield (face up), put a very small piece of blotting-paper right on the prepared surface at each corner, after which lay another glass same size as the prepared one on to it. The pieces of blotting-paper at the corners will keep these two glass plates from coming in contact, and the back plate will prevent the spring on the door injuring the prepared surface. Now shut up your shield, go on and make your exposure, and when you return to the dark-room to develop, do not forget that the plate is in the shield wrong side up. I have made many a reversed negative this way, and saw no difference in the result, other than that it was reversed; just what I wanted.

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COPYING.

BY F. M. SPENCER.*

It is, perhaps, not too much to say that, of all the labour processes and duties of the practical photographer, copying is most irksome and least fascinating of all; at least, so far as the work can be carried forward photographically, it is purely mechanical, and generally confines the operator to a mere reproduction of the works of another with all their faults; it allows little play of imagination or sympathy with the model, and tends rather to degrade than elevate taste. It is not at all strange, therefore, that so little, comparatively, has been written on this subject. As I propose to devote this paper entirely to copying, as applied to portraiture, I shall probably repeat sometimes items mentioned in preceding papers.

A good copying-table and a modification of the camera-box is about all the fixtures needed (not the same as used in life work). The table should be six or seven feet in length, and a little wider than the box, standing about twenty to twenty-four inches high, with ledges on the sides; and, if rollers are not set in the bed of the box, it is a good plan to have a false bed made just wide enough to play between the ledges of the table, into which the rollers may be set, so that the camera may be moved easily back and forward. Into the front of the table should be set a rigid target-post, exactly perpendicular to the bed of the table. Let the target-board slide up and down on this post with a set-screw to secure it at the right elevation. The target should be made to slide in grooves horizontally upon the target-board, and be provided with springs to hold the object or picture to be copied, so that the picture may be set and quickly brought into the field of the camera without re-setting from one to a dozen times. Only the front legs of the copying-table should be on castors.

When a copying-box is not at hand, any box of sufficient size will answer, if in good order, by having cones or extensions made to fit into the front of the box. Straight sections, fitting into each other, and into the camera in place of the front, and so constructed that the ordinary camera front will fit into one or all of them, will be found most convenient, if not better than most of the copying-boxes in use and make it possible to enlarge any picture to the size of the largest plate the box will make, by simply increasing the number of extensions.

Having got everything ready and picture adjusted, the next thing to consider is the light; or rather, we will now consider it, for you ought to decide that at sight of the picture. Daguerreotypes, tintypes, and ambrotypes should always be illuminated by full sunlight, for only the most powerful illumination will bring out all the details. Dark photographs, or photographs having heavy shadows, should be copied in sunlight; but it is an excellent plan to interpose a ground-glass between the sun and the picture, or a screen of two or three thicknesses of tissue paper will serve as well if not better than ground-glass.

In copying Daguerreotypes, move the table so that the bronze-coloured reflection falls outside of the field of the lens, which usually requires a very oblique direction to the sun's rays. The polishing lines or scratches of the plate will usually disappear by this means also. The exposure should be just long enough to catch all the details of the picture.

In copying photographs that are reasonably sharp, it will often be found beneficial in softening the enlarged grain of the paper (enlarged fibres) to move the lens slightly out of focus after the exposure is about half done. No special change or quality of chemicals is necessary, except that the collodion should be rather old and ripe. Proceed with the development the same as for life work until all the details of the original appear, when the iron should be washed off and the development continued with pyrogallic acid and silver until all the intensity desired is obtained. Great care should be observed to wash out the iron thoroughly to avoid stains that will not disappear in cleaning the negative. If sufficient density is not obtained before cleaning the negative, repeat the pyro and silver after cleaning; and it will often occur, where much pushing is required, that the plate seems to become stained a reddish-brown, or almost black, but usually after washing well the stain will entirely disappear by flooding the negative with cyanide; and, as a last resort, it may sometimes be necessary to colour the negative with sulphuret of potassium or bichloride of mercury. Such negatives, however, do not keep well.

There may be some who will see this article that do not understand using pyrogallic acid and silver, and for their benefit I will explain it a little. Dissolve sixty grains of pyro in thirty-six ounces of water, and add sixty grains of citric acid and one to one and a half ounces of acetic acid. In another bottle, make a fifteen or twenty-grain solution of nitrate of silver, and when ready to use drop a few drops of silver into a small wide mouthed vial, and pour upon the negative enough of the pyro solution to cover it, keeping it in motion until it flows quite smoothly, then drain into the vial containing the few drops of silver, and return to the negative, flowing it on and off until the desired result is obtained; and by letting the pyro and silver fall by drops or a small stream upon the face of any part of the negative most needing strength, the after-development may be made to assume a local character. The operator who does not understand manipulation with pyro and silver is not well up in negative making, and should lose no time in becoming familiar with it, as it is quite indispensable.

Copies, especially enlargements, generally need heavier retouching than negatives from life, and a smear of pine-tree resin and camphor is very useful to give a good tooth for the lead. Make a saturated solution of resin in spirits of turpentine, and to an ounce add a lump of camphor about the size of a bean; apply sparingly to the part to be retouched with a bit of cotton, and wipe off any excess quickly with a fresh bit of cotton, and after a few minutes it will take the lead freely. The space to be retouched may be roughened and retouched in the usual way, and the smear applied over it. If a second course of retouching be desirable, and if the retouching be unsatisfactory, a bit of cotton and a drop or two of spirits of turpentine will remove it.

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* *Philadelphia Photographer.*

There are also a few dodges in printing copies, of great value, that I can recommend, and which I do not think are generally well understood.

Vignettes will often appear to better advantage with the groundwork grayed more or less deeply, so that the high-lights of the picture may not be killed by the intenser light of the margin, and are best done by placing the print upon a pad and laying over it, to hold it flat, a sheet of clean glass, quite free from any imperfections, which may be held in the left hand while exposing to the light. Full sunlight, if convenient, is best. The figure (vig.) is to be shielded by a bit of card-board cut to the right size and shape, and fastened to a wire, which may be held in the right hand, and by keeping the shield moving, blend the vignette into the border. Full prints of light grounds, injured grounds, or enlarged copies from photographs, showing fibrous lights and shadows, may be treated in the same way. Varying the form of the shield to suit the shape of the portion of the print not to be reprinted, and by taking advantage of sunlight and shadow at the same time, the background may be graduated at pleasure. It is often, indeed, advantageous to expose all parts of the print (except so much as usually shows in a vignette) to sunlight for a few moments, using a vignette shield to cover the face, collar, and shirt front. When it is desirable to print in a false background, fasten the paper upon which the mask is printed with paste to one end of the negative, which may best be done by having the paper long enough to double back over the top end of the negative, and pasting to the edge of the glass side, so that upon cutting the mask it will exactly adjust itself.

Having printed the mask until the outlines are all out, take the negative out of the frame and lay it face up, with the top end to the edge of another sheet of glass; turn the mask back and carefully cut out the figure with a sharp knife, and replace the negative in the frame and make a print. Now take a sheet of clear glass somewhat larger than the print, and with a bit of wax fasten the figure cut out of the mask, face to the glass; lay the print upon a pad upon a second glass of the same size, and adjust the figure of the other to the figure of the print, so that they superimpose; holding the whole in place with the hands, expose to light, and by a slight but dexterous movement of the upper glass, the background may be printed in so that no white line will show at the outlines of the figure, and by taking advantage at the same time of sunlight and shadow, the background may be graduated at pleasure; in fact, this sunlight and shadow dodge is a good one for every-day use.

The toning and finishing of the prints may be done in the usual way until they are ready to retouch. Albumen prints should never be retouched in dead pigment; the pigment should be mixed or ground in albumen of full strength, or the albumen should take the place of the water-cup for moistening the brush or both. The albumen may be prepared by beating the white of a fresh egg to a stiff froth, and decanting the clear part that settles. Albumen so prepared may be dried in saucers and bottled up for future use in mixing pigments, or for albumenizing glass, as it readily dissolves in water. Colours wrought on albumen with albumen, match, so to speak, in glass, and are more easily applied, the colour being much less slippery than with water.

THE COLLODIO-CHLORIDE PROCESS.

BY GEYMET.*

In this process the picture film can be removed and transferred to another surface; it can therefore be usefully employed in a variety of ways.

1. *The Collodion.*—Four solutions are required for preparing the emulsion:—

a.—Alcohol of 36°	... ...	100 c.c.
Silver nitrate	... ...	2 grams
b.—Alcohol of 36°	... ...	100 c.c.
Strontium chloride	... ...	2 grams
c.—Alcohol	... ...	100 c.c.
Citric acid ...	... ...	5 grams
d.—Alcohol of 40°	... ...	100 c.c.
Ether of 62°	... ...	100 ,,
Pyroxyline ...	... ...	4 grams

The first three solutions are filtered. Into 100 c.c. of the raw collodion (*d*) pour first 10 c.c. of the strontium solution (*b*), and then 10 c.c. of the citric acid solution (*c*). This mixture is sensitized by dropping in 5 c.c. of the silver solution (*a*), which turns it milky. It is left in the dark till next day, and then the clear part, which alone is of use, is poured or drawn off from the sediment.

Alabaster paper is used for the support, and is prepared as follows:—

Water	... ...	900 grams
Baryta white	... ...	100 ,,
Gelatine ...	... ...	20 ,,

The gelatine is dissolved in the water bath, mixed with the baryta white, previously rubbed up in 100 grams of water, and filtered through fine linen. A sheet of well sized paper is laid on a glass plate somewhat smaller than itself, and the edges are turned over and pasted on to the back of the plate. The white gelatine is spread evenly over the paper with a brush. When it is dry, the film is polished with a flannel rubber, and the edges are cut through.

This alabaster paper is laid on a smooth board, and the edges are turned up so as to form a kind of trough. The emulsion is poured evenly over the paper, and the board is placed in an inclined position. Only one film may be poured on the paper. The paper can be used directly after drying, but it will keep white and unaltered for a couple of months.

The following toning bath must only be used when the pellicle is to be transferred to another surface. Various other salts will give very fine tones, but they make the gelatine insoluble, and then it is impossible to separate the collodion from the paper. The print must be as intense as possible, as it weakens in the toning bath.

For the gold bath the formula is—

Water...	... ...	1 litre
Ammonium sulphocyanide ...	...	20 grams
Double chloride of gold and sodium		1 gram

Only so much of the bath must be taken as can be used on the same day. As soon as the picture is dipped into the bath it turns a straw-yellow, but after a while the colour deepens. If this bath be poor in gold the picture will remain yellow for a long time, while too much gold gives it a disagreeable red tint.

The picture is fixed by immersion for four or five minutes in the following solution:—

Water	... ...	1 litre
Common salt	... ...	60 grams
Hyposulphite of soda	... ...	100 ,,

The print is made clearer in this bath, and becomes finer than one on albumen, because the grain of the paper is concealed by the gelatine.

2. *Pictures on a Coloured Ground.*—The baryta white in the gelatine can be replaced by other colours, as cobalt blue, blood-stone, cadmium yellow, &c. Charming moonlight effects are obtained with cobalt blue, and blood-stone is used for the reproduction of terra-cotta figures.

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* *Phographische Archiv.*

As the blue black tints do not come out well with these colours, a different toning bath, giving ruddier tones, must be employed, viz.:—

Water	1 litre
Hyposulphite of soda	120 grams
Common salt	60 ,,
Double chloride of gold and sodium	1 gram

The pictures must not be washed too long; five to six minutes are sufficient, but the water must be often changed.

TRANSFERRING THE PRINTS.

3. *Pictures on Gold and Silver Paper.*—Reproductions of weapons and armour, and of medals, and goldsmith's work, possessing the metallic lustre of the original, can be obtained by transferring the pellicle to gold and silver paper. For this purpose pure gold and silver paper only may be used, as the imitation papers, which are made of copper and lead, soon oxidise, and the picture is ruined. To imitate old medals and coins, the gold or silver paper is coated with gelatine, in which, by means of a brush, green and yellow colours are unequally distributed. After drying, the pieces nearest in colour to that of the medal or coin to be copied are cut out.

The collodio-chloride picture is transferred in the following way:—When toned and fixed, place it in a pan of warm water, the temperature of which must not exceed 80° C. In from two to three minutes the pellicle of collodion begins to separate from the paper; as soon as it detaches itself at the corners, it is time to transfer the picture. Lift the paper out of the bath without taking off the film, for the latter is much too delicate to be operated on alone; it must, therefore, be left on the paper. The whole is laid, with the collodion film downwards, on a glass plate, of which the dimensions are in each direction one centimetre less than those of the paper, and the protruding edges are turned over it. To remove the air-bubbles, press the paper on to the plate with the hand. Now turn the plate up again, and detach the paper, so that the pellicle of collodion remains attached to the glass.

It will be seen that the picture is, in this stage, not clear, because the film of baryta-white, which has rendered possible its separation from the paper, still remains attached to it. To remove this, rub the film with a cotton pad dipped in warm water; the collodion is fairly tough, and able to withstand the rubbing better than might be thought. Not a particle of white must remain on the picture, nor yet on the reverse side. On this account, rinse the plate well on both sides under the water-tap. Next damp with water a sheet of ordinary white paper of the same size as the plate; lay it evenly on the collodion, and press out all air-bubbles with the hand. The edges of the collodion film, which were bent over the glass plate, are now turned over the paper, and the two together are drawn off the plate. Turn it up and place it on the same plate with the picture-side upwards; rinse the film again under a jet of water. Rubbing with the cotton pad is not required, because the baryta-white has not settled on this side.

We now arrive at the transfer of the picture to its permanent support; this may be a piece of gold or silver paper, an ivory tablet, an enamelled or porcelain plate, or a plate of opal or transparent glass, according as a transparent or a positive picture is required. Before the transfer, the support must be coated with a layer of gelatine when the support is hard, as in the case of glass, porcelain, or enamel; this coat must be allowed to get dry, but when the support is of paper this is not necessary.

Let us take the case of a hard support. Dissolve six to seven grains of gelatine in warm water, and filter it through paper; but wait till the solution is lukewarm, for only in this way can bubbles be avoided. Clean the plate thoroughly, and pour the solution over it, just as you would do with collodion; one coating will be sufficient. Place it in a position slightly inclined to the vertical on a piece of blotting-paper. In cold weather, warm the plate before coating it. When the gelatine has set, remove the lump which will have set at the lower edge. Convex plates of enamel or glass must be dipped bodily into the gelatine, and then placed with their convexity upwards on blotting-paper until the gelatine is perfectly dry. Immediately before the transfer the plate is dipped for a very short time in cold water, so as to soften the upper surface of the gelatine. The paper, with the picture film downwards, is then laid on the gelatine layer, pressed with the hand so as to remove superfluous water, and the plate placed on one side to dry, care being taken not to injure the picture by friction. Finally the white paper is taken off, and the picture is completed.

The picture is transferred to gold or silver paper as follows:—Lay the paper on a clean glass plate, and moisten it slightly with a damp brush; turn it over and coat it on the metallic side with a very thin coat of gelatine by means of a brush. The picture film, after being well washed on both sides, must also be laid on a glass plate. Now place the gold or silver paper on the film, and press them together with a damp cotton cloth, so as to facilitate the paper spreading properly, and to avoid the formation of creases; the gelatine will attach itself to the collodion. Turn the picture, and leave it to dry on a clean glass plate; for the first five or six minutes of drying, watch it carefully, and puncture with a fine needle the vesicles that keep constantly forming. Before finally fixing the film, retouch the picture with a mixture of Indian ink and carmine; then lay it on a small board, turn the edges of the paper over a cup or basin, and varnish with a mixture of equal parts of amber varnish and chloroform. Finally, polish the picture, and rub it in with cerate. By varnishing the picture loses its unpleasant metallic lustre.

PICTURES ON ENAMELLED PLATES.

These pictures look as well as those burnt in enamel, but are not so permanent as the latter. The plate is gelatinised according to the instructions given above, and the picture film placed to float on water. In order not to touch the plate with the fingers, it is laid on a curved strip of tin plate, and dipped into the water immediately below the film; the two are lifted out together. All folds or creases are removed by smoothing the film with a wet finger until it adheres completely. After drying and colouring, immerse the picture in a basin full of amber varnish, which dries immediately, giving great brilliancy to the picture, as well as rendering it firm and hard.

DIRECT PRINTS ON OPAL GLASS.

To obtain directly a film of collodio-chloride on glass, the following method must be pursued:—Clean the glass plate, coat it with white of egg, and let it dry. Then pour the collodion over it in the usual way, and when that has set, dip it into distilled water, and move it about on the dipper till the water runs over it evenly. Put the plate to stand in a nearly vertical position on filtering paper, and leave it to dry. It may be kept for a long time. Before using it must be fumed; to effect this, place a fuming box on its side, so that the plate may have a horizontal position. In the box place fifty grains of ammonium carbonate; insert the chloride of silver plate with its film downwards, and close the box. The fuming will take a couple of minutes.

When using the common copying frames for pictures on opal glass, over-exposure will do no harm. There are special frames made for the purpose, in which the process can be watched, though they are by no means necessary.

Collodio-chloride must always be exposed in diffused light. After toning in the ammonium sulpho-cyanide bath, the picture can be reduced, even when it is much too dark (or burnt, as it is technically called), in a bath of two per cent. solution of potassium cyanide, without materially affecting the tone.

The Photographic News.

Vol. XXII. No. 1025—APRIL 26, 1878.

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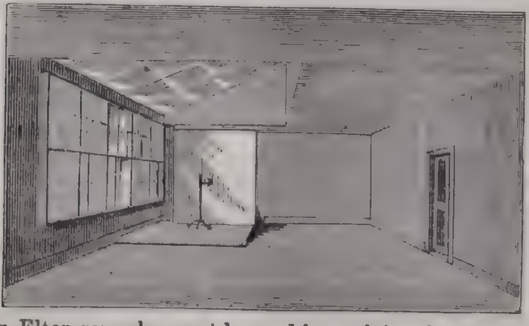
THE "PANEL" PORTRAIT.

A novelty in style and size of portraiture has been introduced in America, by Mr. G. M. Elton, of Palmyra, N.Y., an example of which gained a prize offered for an illustration by our Philadelphia contemporary, the specimen being issued in the number for the present month. It is styled the "panel" picture, and is a decided novelty in proportion and shape. Tastes will differ as to its artistic claims, but it is certainly striking, and will arrest attention, the example published being decidedly pretty. The length or height of the picture is five and a-half inches, and the breadth two inches, a photographic tint considerably lighter than the background surrounding the picture, the outside proportions of picture, including tint, being seven inches by four inches. The subject is a standing figure of a graceful girl; the background an interior of a room, a fore-shortened view of one side including a fire-place, and window being included. The chief defect in the example under notice arises from the shaping of the top of the picture, which is a dome or arch not spanning the whole breadth of the picture, but leaving a square shoulder projecting at each side, a form very commonly used in tombstones. Its presence in the tall narrow picture has hence the effect of suggesting a tombstone. A simple square-cornered rectangle would probably look best in such a picture, or a very flat dome. Individual taste will, however, guide in such matters.

Novelty in style is often beneficial, there cannot be a doubt, in stimulating sluggish business, and we have Mr. Elton's testimony that this style has proved very attractive amongst his customers. Variety is always valuable in a specimen room, and a few examples of a novelty in style which involve no cost for material or apparatus must be worth production by all portraitists. Some judgment, as Mr. Elton remarks, must be used in applying the style. It is essentially fitted for the standing figure, and, where available, a graceful and well-dressed figure. Stout persons, or sitting figures, would not look well at all in such a picture: the background will require judicious selection, containing vertical rather than horizontal lines. At any rate, the style is easily tried, and if taste and judgment are used in the trial, many of our readers will, we think, like the novelty.



We need scarcely add that any studio suited for producing good card portraits will answer for these; but as modes of lighting are always interesting to portraitists, we reproduce from our contemporary a drawing of Mr. Elton's studio.

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THE FERROUS OXALATE DEVELOPER.

We are favoured with the following note on the new iron developer for dry plates by Mr. J. W. Swan:—

"It may interest those of your readers who are using the ferrous oxalate developer to know that the activity of the solution which has become spent by use or exposure may be restored by means of metallic iron. The best way of procedure will be to keep permanently a hank of fine bright iron wire in the solution, and, if necessary, to quicken the deoxydizing action by heating the solution and iron wire together until the full effect is produced."

For the convenience of those of our readers who may desire to try the ferrous oxalate developer, we may repeat the instructions for its preparation:—Dissolve six ounces of neutral oxalate of potash in a pint of hot water. This will make a saturated solution. To this add six drachms of ferrous oxalate. When it has dissolved as much as it will, filter. It is best used in a dipping bath. An average of a quarter of an hour is necessary for developing a plate.

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RELIEF AND BREADTH.

BY W. HEIGHWAY.

To a certain extent—and to a certain extent only—relief is a most admirable quality.

It is just one of those things we photographers have been fostering, until, like the ungrateful serpent of the fable, it has turned and stung us.

There is no doubt that many photographers are badly bitten with this craving after roundness and relief.

If for a moment we consider, it cannot fail to strike us that an excess of relief is vulgar and senseless; the object of a picture being to *represent*, and not to DECEIVE.

The cultivated mind cannot but resent being tricked into the belief (more or less vivid) that it is looking at actual nature when a pictorial representation only is presented to the eye.

Such a victory over the senses is worse than defeat.

No doubt, to the unthinking and the vulgar there may appear to be a great deal of art in the production of a picture of which this relief is the studied effect; so that such people can see plainly all that is to be seen they are satisfied, and when they feel they "can almost see round the figure" they are ecstatic in praise.

It saves a good deal of trouble and the necessity for thought; indeed, the mind capable of appreciating such work would be unfitted to enjoy true art.

A picture which gives no scope for thought is not worth looking at, certainly was not worth the time and labour spent over its production.

How many photographs, if they had the power of consciousness, would be thoroughly ashamed of themselves, and hate most fervently the authors of their being.

How few could proudly hold up their heads and say, "I am only a poor little photograph—but I have a soul."

Do not, however, run away with the idea that the quality of relief is altogether to be avoided. It is the excess of it that is so thoroughly objectionable.

Is it too much to say of Art that the *best has been* done, and, at the most, this or any succeeding age can but aspire to re-clothe the past?

REMOVED
APR 1959

I think this is so—because periods of art are not to be traced by any discovery of new facts or new laws, but only as indicating diverse modes of thought, the growth of refinement, culture, the impulses of an age or people; but with all, and through all these, we recognize the great fact that the same art principles govern all time.

This being so with Art—and I believe most of you will agree with me in recognizing this as a truth—how necessary it becomes that photographers should be content with the old rules, and refrain from trying to invent a new and original code.

Depend upon it, as you conform to, or kick against, the trammels of tradition, so on your action will depend the rank photography will take among the arts.

Is it to be a Fine Art or not?

Our standard of definition should be that adopted by painters, as nearly as we can manage it with our tools—and don't let us be ashamed of our work because of its unavoidable shortcomings.

Our balance of light and dark must conform to the good old rules, and as we take these as our standard of relief on a flat surface, it will at once be seen that our idea of relief is not that of the grand men of the past.

We have, in fact, gone beyond them! But is it only to be obliged to retrace our steps?

How are we to attempt more than the *suggestion* of the glorious light of the sun, the profound depth of space, or the beauty of nature's middle tints?

What have we for them? White paper or paint for sunlight; darkened paper or black paint for the mystic, indescribable shadows of nature; and for half tints stealing gently over beautiful curves—only a flat surface. You see the two don't run on all fours. No doubt if we had nature's resources we could—but we hav'n't, so don't let us be idiotic enough to try to do more than we can.

We have to face one of three things, if we think, on looking at an object in a picture, that we could walk round it—

Either that there is something very wrong with our eyes—that our taste requires refining—or, that we are looking at a poor piece of art.

Now don't run away to the other extreme, and revel in fog, poverty of tone, weakness, and obscurity—and say I told you to! I don't; but too great relief cannot be strongly enough condemned.

Whatever arrangement of light and shade we adopt for our picture, care must be exercised that we secure breadth: without it the picture can never be viewed with pleasure, scattered lights and darks causing irritation to the eye. Broad and continuous lights and shadows, even though the contrasts be extreme, lend a charm and poetic beauty to the object pourtrayed, and the artistic sense is gratified.

It has doubtless struck most of us, in looking at some scene in the gloaming, which under the garish rays of full day was ordinary and uninteresting enough, how it has with the beautiful breadth of the long shadows acquired a new and strange charm.

So with our work must we do all in our power to secure breadth of effect; and this naturally, without effort that is apparent and studied.

And, above all, without exaggeration.

Too great breadth is dull, monotonous, and wearisome. Of it in excess comes weakness; and

" *To be weak is miserable.*"

THE MODERN PHOTO-MECHANICAL PRINTING METHODS.

BY ERNEST DUBY.

Wer Vieles bringt, wird Manckem Etwas bringen.—Goethe.

Perhaps many of the readers of the Photographic News will be astonished to see that I am about to describe the different methods of printing by means of photography actually used. They will, perhaps, say that these "modern" methods are old, and that they have read treatises on them a hundred times at least. However, I beg to say that they are partly right, and partly wrong. It is true that a great many large volumes have been edited treating of photo-lithography, heliography, and the rest. If, notwithstanding, I venture to give one more description of them, I do it with the conviction that the manipulations I teach are the simplest possible, and that every photographer will, by means of them, be able to make photo-lithographs, heliographs, relief-plates, carbon-galvano plates, &c., and all with very little cost. Therefore, if the readers of the News will be kind enough to read my remarks, I trust they will very soon be fully satisfied.

Some few of these methods have already been described in my journal, *Photographisches Wochenblatt*, and my first intention was to give merely a translation of them. I thought it, however, better to treat them once more in original articles, enlarging them by the experiences I have made of late. If anything therein should not be fully understood by my readers, I shall always, with the greatest pleasure, give more particular explanations. The first photo-mechanical printing process I am going to describe is

Photo-Lithography.

Photo-lithography is a combination of the common reprinting process of lithographers with photography. The drawing engraved by the lithographer on the stone is generally transferred to different other stones, a method by means of which a considerable number of prints may be had in a very short time. Now the glorious sun, when politely invited by good lenses and sensitive chemicals, will make a very good lithographer, and that is a valuable thing for the photographer. There are many illustrations done by lithography—as, for instance, illustrated price currents, &c.—that could easily be done with the help of photography; and why should the photographer not try to gain money wherever it is to be gained? I need not say that only such designs can be done by photo-lithography as may be executed in common lithography.

The first thing you must have is *a very good negative.* Consequently, only such originals must be reproduced as will enable the photographer to take a good one. Do not spend your time in trying to reproduce originals already grown yellow by time, or such as present too harsh contrasts between lights and shadows, in which, naturally, the clear part will already be over-exposed when the dark one has not yet enough. In general, I may say that those originals of which a good reproduction may be taken for common photography will answer well for photo-lithography. Let the negative be very dense, the lights (lines) very clear, and intensify with pyro and silver, and afterwards with perchloride of mercury, until the shadows be quite dark and opaque.

The collodion I use, and which I found to be the best, is that of Mr. Renekendorff (to be had at Messrs. Hughes and Co., Cheapside); I can with good conscience recommend it to my readers. Let the silver bath be well acidulated with nitric acid, so as to avoid every trace of fog. *Note that, as soon as there is the slightest fog in the negative, it is of no value at all.*

When varnishing, take care that the varnish is very clear and transparent; a very good negative is, as I have already said, *conditio sine qua non.*

Now prepare your paper. Photo-lithographic paper, it is true, is to be had in the market; I, however, prefer to make it myself, and am sure my readers will soon do the same. I always take wasted sheets, of albumenized paper, from which I wash the albumen off by means of a clean sponge dipped into clean water. By this method the wasted sheets of paper will yet be of some use to photographers. When all the albumen has been most thoroughly removed from the paper, hang the sheets up, and allow them to dry. Meanwhile prepare the following solution:—

Gelatine...	8 grammes
Rain-water	250 cub. cents.

Only gelatine of the best quality—such as Nelson's—should be taken, as a bad one will spoil the whole of the picture. First soak it in cold water, adding the warm one by-and-by. A few drops of a saturated solution of *chrome alum* will now be added to the still warm gelatine solution. A good deal of care is necessary with this operation. As soon as you pour the whole of the chrome-alum *at once* into the gelatine, the latter will fall to the bottom of the vessel, changed into an insoluble lump. You must, on the contrary, add the chrome-alum solution *very slowly, drop by drop*, and well stir the gelatine during the time of chromating it. For the above-mentioned quantity of gelatine solution, *five* to *six* drops of chrome alum will be quite sufficient.

Spread then, by means of a soft broad pencil, the warm and alumed gelatine on the above-mentioned washed and dried paper, carefully guarding against the strokes of the pencil being seen afterwards. It would not do to let the sheet swim on the gelatine solution, since, firstly, the film would become too thick; and afterwards, when the sheet is hung to dry, the gelatine would run down and make the lower end much thicker than the upper. It is not at all difficult to spread it on the paper with a pencil, and that is the only way of having good results.

When all the sheets have been coated with the gelatine film, hang them up and let them dry in a place where they will not be injured by dust and heat. Do not take it off before it be *completely dry*, which will easily be seen by tapping on it with the finger. Along one edge the sheet must then be glued on a clean wooden board. Beat now the white of an egg to froth, filter it, adding in summer-time one or two drops of water, and mix it with a few drops of a concentrated solution of *bichromate of potassium*. This mixture must be spread on the gelatine film with a soft, broad pencil, again carefully avoiding any visible pencil strokes, then glue the other three edges of the sheet to the board, and allow the whole to dry, *in a very dark room.*

(To be continued.)

FRENCH CORRESPONDENCE.

Paris International Exhibition—Photography in the Service of the French Police—Boivin's Ammoniacal Collodion.

By the time that this letter appears in the Photographic News, the last day on which goods can be admitted to the Paris Exhibition will have passed. As far as the French exhibitors are concerned, I dare not affirm that all the photographers who have had space allotted to them will be ready by the date named; fortunately for them, there is reason to hope that the regulation will not be strictly adhered to, provided that the works that have to be carried out by the executive suffer no delay, so as to prevent the opening of the Exhibition from taking place on the 1st of May. In the class for Photography of the French Section there will be 199 exhibitors. Of these, 144 will be landscape and portrait photographers, and their works will be hung on the walls and partitions of the gallery reserved for photography in the south-east wing of the building in the Champ de Mars. There will be 25 who are manufacturers of photographic chemicals and makers of apparatus and optical instruments, who will exhibit their goods in upright and flat glass cases. The exhibitors of miscellaneous objects will number 20; they will have tables and stands of different kinds. Finally, there will be 10 stereoscopic and other photographers, for whom screens with panels and frames will be arranged, so as to show to advantage the photographs which must be viewed by transmitted light. The number of 199 exhibitors cannot be regarded as definitely settled, as there are sure to be others for whom space will be found at the last moment.

A collection in this class which will no doubt specially attract public notice is one that will be contributed by the photographic department of the Prefecture of Police. I have already had occasion to communicate to the readers of the Photographic News the organisation and the development of this department, whose sphere of action is extending, and the importance of whose operations is increasing daily. At the present time, the books, papers, and portfolios stored in the office of this department occupy a considerable space, and form records full of curious information on subjects of both public and private interest. As soon as a murder is discovered, photographers are sent by the police authorities to the spot where it was committed. The house which was the scene of the crime is reproduced by photography from different points of view, omitting nothing which can convey to the ministers of justice an idea of the manner in which the deed was done: the exact place where the victim fell, the trace of the struggle where the murderer met with resistance, are all transferred to photographic records; in some cases, even the scene which is thought to have occurred is restored by arranging different prisms in the supposed attitudes and positions of the actors in the tragedy, and taking a photograph of the group. All the objects and circumstances from whence deductions can be drawn, or theories proved, serve to furnish negatives, the prints from which are submitted to the magistrate and jurymen. In cases of arson, the condition of the furniture and fixtures damaged or destroyed, and the implements which the defendant may have used to commit the crime, are reproduced by photography. In trials for forgery, a photographic fac-simile of the paper is prepared, with the suspected figures or forged signatures enlarged to any extent that may be necessary. False keys and the other tools of burglars are also photographed. Accidents, again, afford a large number of subjects to the photographers of the police. In the singular collection of which I am speaking, and which I have just finished examining in detail, there are views of buildings which have fallen in and caused many deaths (particularly that of the *Eglise des Ternes*), also of accidents such as the collision of an omnibus and tram-car, or of fatal accidents by carelessness which had given rise to lawsuits. Visitors to the Exhibition will recognize in this collection representations of scenes and reproductions of documents relating to some of the most thrilling procedures in the law courts which have of late years excited the inhabitants of Paris. Portraits of murderers and their victims, pictures of the details of their crimes, will be exhibited just as they were shown to the judges and officers of justice. Here is quite sufficient to attract a crowd, but it is not all. Two full sized albums for photographs of large dimensions will be shown; the first of these contains views, taken during the inundations of February and March, 1876, of the central parts and suburbs of Paris which suffered most from the floods; the other contains views of monuments and ruins illustrating the construction of the old Prefecture of Police. Interiors of the *Morgue*—the gallery called the *salle des morts*, the postmortem room, &c.—will make the public acquainted with the other parts of this cheerless edifice, of which the entrance hall and exhibiting gallery are the only portions generally open to them. Another series is that of photographs of the prisons of the Department of the Seine and their accessories; in this will be shown the rooms for study (recently fitted up), the workshops, and the yards of the prisons of *La Roquette*, *St. Lazare*, *Mazas*, *St. Pelagie*, and *La Sante*. A selection of portraits of officers of the police, showing their different uniforms, will complete this highly interesting and almost unique exhibition. It has cost many years of anxious labour to induce the authorities to place the photographic department of the police on its present effective footing; a careful examination of the work enables us to form an opinion of its value and usefulness.

M. Ernest Boivin has introduced a new collodion to supersede that generally employed in the carbon process, in several dry processes, and in the albumen process where rapidity is required. He makes it by dissolving ordinary cotton wool in a solution of ammonia of 22°, containing fifteen per cent. of hydrated carbonate of copper. The cotton must be such as is usually taken for the manufacture of pyroxyline; it must be perfectly free from all fatty matter. M. Boivin first prepares the mixture of ammonia and copper salt, and, when their action is complete, he adds the cotton by small quantities at a time. It is then well stirred, and after the cotton has dissolved the solution is filtered through asbestos, or it may be left to settle in a bottle with a ground glass stopper, after which the liquid is decanted. If a collodion adhering easily to the glass plate be required to obtain opalescent films, a little resin must be added to the caustic solution. To coat the plate the mixture is poured on to it as with ordinary collodion; as soon as the film adheres, and is quite dry, it is immersed in water acidulated with nitric acid. This will at once cause the blue tint due to the copper salt to disappear, and when the plate has been washed there will remain only a film of pure cotton attached firmly to the glass. It may be again coated with albumen while still wet from the last washing, or it can be moistened only when it is desired to albumenize it. After the last washing also the bromo-iodide solution may be flowed over the film; then dry, or merely drain, and plunge into the silver bath with the ordinary manipulations for a silvered plate. Plates prepared in this way are highly sensitive. The solubility of cotton in an ammonia-copper solution having been long known, M. Boivin cannot understand why this property has not been before utilized in the same way as he has done.

Ernest Lacan.

OBERNETTER'S MODIFIED COLLODION PROCESS.

BY DR. VOGEL.[*]

Messrs. Obernetter and Albert are continually making trials for perfecting the Lichtdruck in natural colours, where it is required to work with various sensitive substances, as iodide of silver, bromide of silver, &c. For the usual work it would, therefore, be necessary to have several collodions on hand. Obernetter, however, works differently. He has one collodion, which is neither iodized nor bromized, but simply contains nitrate of silver. He proceeds in making a solution of 5 grammes of nitrate of silver in 2 cubic centimetres of warm water, adds a drop of nitric acid and 250 cubic centimetres of alcohol, then 6 grammes of cotton and 150 cubic centimetres of ether. After this mixture has settled or been filtered, it is fit for the various uses. If, for instance, a bromide silver plate is wanted, one simply collodionizes a plate, which is afterwards dipped in a bromide-potassium bath of 1·15. If a bromo-iodide silver plate shall be produced, the same plate has to be dipped in a mixture of iodide and bromide-silver bath; such plates are, on account of the adhering solutions, very slightly sensitive. It is, therefore, advisable to wash them with pure water, and expose, whether they are wet or dry. The bromide-silver plates have to be exposed immediately after they have been washed, and to be developed with an alkali developer; but I found that they are less sensitive in the wet state than when they are dry. They will be more sensitive when poured over with sensitive substances.

This way of working is by all means safer than the preparations of bromide-silver emulsion, when a little mistake can spoil the whole job. In working with iodide of silver the plates are but very slightly sensitive after having been dipped in the solution of iodide of potassium and having been washed. They will receive the sensitiveness of the usual wet plate after pouring over them the ordinary silver bath. Only a small quantity of bath is wanted, and the plates are exposed and developed as usual. I tried the method with the best success. The treatment with the silver bath is very easy. No greasy streaks, spots, pinholes, or other flaws will be noticed.

Obernetter applied this process for ordinary operations, and has made an excellent reproduction of a drawing in lines. In order to get a plate equally sensitive with our common silver plate, he recommends a bath as follows:—

Iodide of potassium	5 grammes
Bromide of potassium ...	1 gramme
Water	90 grammes

Portrait photographers, for whom a quick preparation is a very important point, will always prefer the wet-plate process. This, however, does not in the least alter the importance of Obernetter's method.

WITHOUT ACKNOWLEDGMENT.

In a recent number of the News, Captain Abney complained of being copied without acknowledgment in our *Philadelphia Contemporary*. In justice to Mr. Gihon we reproduce the following from the last number of that journal. After copying Captain Abney's letter and our note, the Editor adds:—

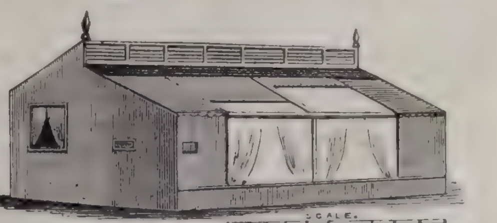
"We very gladly give space to the above extract from the Photographic News of March 1st; first, because we have the highest respect for Captain Abney and his very valuable contributions to photographic literature; and second, because we deprecate the habit, which seems general in some directions, of clipping from another source without acknowledgment. Moreover, we desire to exonerate Mr. Gihon from any intention whatever of doing otherwise than make proper acknowledgment of all that he uses.

"In beginning his series of articles or 'Scraps,' he consulted with us as to the policy of adding the author's name in each case, and stated that in some instances he could not, because he had forgotten the source, or neglected to mark it in his scrap-book. We therefore advised him to place in the beginning a foot-note, which occurs in our January issue, as follows: 'In the beginning, I beg to acknowledge my indebtedness to all known sources of photographic information for what I gather from them, without further credit.—J. L. G.' Perhaps Captain Abney did not see this; and if at any time Mr. Gihon sins again, we shall be glad to have our attention called to it, and make special acknowledgment. So much do we value Captain Abney's services in this direction that we have ordered a copy of his book from the publisher, and hope soon to receive it, and review it according to its merits; and from what we have read of his former works we believe the review will be one that we trust will help sell the book, and honour the author of it.—Ed. *P. P.*"

PORTABLE STUDIO.

BY J. H. CORSCADEN.

A short time ago I had the pleasure of giving the plans, &c., of portable studio, in the Photographic News, but it has, perhaps, been too expensive for some. I give one which is built on the same principle, but not near so costly, for, in the first instance, there are no glass sashes, and the part that should be covered with wood, &c., is hung



Studio in full working order.

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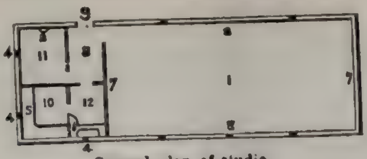
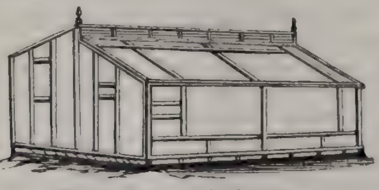
[*] *Philadelphia Photographer.*

with waterproof canvas. The walls that divide the different compartments are frames with canvas tightly stretched over them, and can be painted in panels to form wood. It is in all other respects the same as the one above mentioned, fitted with bolts and screws, iron plates, &c., &c., and will be found one of the most economical, portable, and healthy studios ever possessed by the amateur or professional photographer. If any further information concerning these communications be required, I shall be happy to supply it through the Photographic News.



Ground plan of studio.

1. Studio. 2. Stove. 3. Light side. 4. Windows in rooms. 5. Table in printing room. 6. Table and sink in dark room. 7. Background in studio. 8. Passage. 9. Main door. 10. Printing room. 11. Waiting room. 12. Dark room.



Frame work of studio elevation.

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Correspondence.

NOTES ON THE BEECHEY DRY PLATES AND PRESERVATION OF SENSITIZED PAPER.

Dear Sir,—I send you a picture. Let me tell you at once it is not for competition at any photographic exhibition; it is not for sale; and it is not worth accepting as a gift. Nay; I will go further, and admit that it is not a good one—further still, and own that it is a shockingly bad one. And yet, sir, there are circumstances connected with it that make me hope you will look at it with some little interest when I give you its history.

On August 17th, 1876, I prepared a batch of the Beechey plates. On examination, before packing them away, I found three with slight imperfections, which (intending to experiment upon) I packed in yellow paper quite loosely, and placed them on a shelf in my dark-room standing against the wall. This dark-room is a mere outhouse on the ground, so damp that in winter the walls literally stream with wet. There they remained till the 20th April, 1878, a year and eight months. On this latter day I began to clear out the room to prepare for the summer compaign, and in doing so found the yellow parcel, the paper where it rested on the shelf having almost perished from damp. On looking at the plates I was surprised to observe that although hopelessly freckled with damp, yet their original colour was unchanged, and I had the curiosity to expose one at a back window. Using a doublet with full aperture, I gave fifty seconds' exposure at 5 p.m., and developed it later the same evening. This operation presented no difficulty; in about thirty seconds the picture, as usual, "walked up to me;" and here it is.

I think you will be satisfied that this is a strong evidence in favour of the keeping qualities of these Beechey plates. Had they been preserved with even ordinary care, I feel certain that they would have yielded results equal to newly made ones.

But this is not the only peculiarity about this wonderful picture: I have to add that it is printed on paper which I purchased ready sensitized in April, 1876, and which has been merely kept between leaves of soda blotting-paper the whole time. I may mention that the paper is Durand's, although I do not mean to imply that that of other makers would not have kept equally well under similar conditions.

I enclose a piece of this paper kept as described.—I am, dear sir, yours, &c., **Photo-Chemicus.**

[That the plate had become mottled and injured by damp is evident enough, but it is equally evident that a sensitive film remained in sensitive condition, which would probably have been perfect under proper keeping conditions. The report on Duraud's paper confirms what we often hear.—Ed.]

FROM THE ANTIPODES—A CONTRADICTION.

Sir,—At page 604 of the Photographic News, December 21, 1877, Mr. E. T. Whitney states that, being troubled with weak eyes about twenty-one years ago, he glazed his new building, then constructing, with a light-blue glass ground on the inside, and that that "was the first blue light ever used in photography." To that allow me to give the most unqualified contradiction. The first blue glass roof was used in the house in Holborn, London (the first house west of Furnival's Inn), in the year 1841, and used as an experimental place for working out Beard's patent. The next was the first gallery opened to the public at the Polytechnic Institution, Regent Street. Galleries glazed with blue plate ground on the inside, and made at St. Helen's, in Lancashire, were opened in 1842, at the following places, I believe, in the order named: Liverpool, Plymouth, Bristol, Nottingham, Brighton, and Leeds.

A paper on galleries and blue glass I intend for the News, or else for the Year-Book for 1879. **J. F. Stephens.**

THE PARIS EXHIBITION.

Dear Sir,—Being in Paris on business connected with my exhibit at the forthcoming Exhibition, I thought it might interest some of your readers to learn something as to the progress of the British Photographic Department. This, to all appearances, is sadly behind; but Capt. Harris, who is indefatigable in his exertions to have the British Section ready, assures Mr. Warnerke (who is also here) and myself that all will be well, and so we must hope it will be so, even though it be left to the eleventh hour.

The French Department bears a marked contrast to this: all the allotments are here, all carefully and tastefully arranged. Most of the exhibits are hung, and, so far, they speak well for the Frenchmen.

The Exhibition generally is in a very unfinished state, and it seems impossible to have it ready by the date named for the opening. The general effect is, however, magnificent; and when the thousands of cases now in the building have yielded up their treasures, and all is in order, the effect will certainly be indescribably grand and beautiful.—Yours truly, **Payne Jennings.**

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Proceedings of Societies.

Photographic Section of the American Institute.*

The **Secretary**: I had in my possession, and still have, a series of French lenses which, if you remove from the cells, and look through the edge, you will find the glass has quite a blue tinge, instead of yellow or green. These lenses worked a very great deal quicker than any others I ever used. They are also somewhat thinner than our American lenses; that may have had something to do with their action. I found that the lenses made by that firm invariably had that tinge of blue. Another fact was brought out by the complaint of a brother photographer that his lenses, which he had been using some eight or nine years, he was confident worked a great deal slower than at first. The question naturally arose, why they should work slower? He had been through experiments which convinced him it was not retardation resulting from the use of chemicals less sensitive to light, but it was really the lens. It had been used for out-door work, and he had allowed the light to strike on it (probably been in the full blaze of sunlight for a great many hours), and it is possible that the tinge of the glass may have changed somewhat.

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* Continued from page 192.

The **President**: The colouring of glass by long exposure to light depends something upon the flux used in its manufacture. One of the proprietors, Mr. Garfield, of the Lennox Glass Works, in Massachusetts, was at one of our meetings several years ago with a large quantity of samples, specimens of glass that were very old, some obtained from windows in buildings at Bowling Green that had been in the windows fifty, sixty, seventy, or more years, and had turned very deep, dark brown. He stated that this result obtained mainly in glass where magnesium salts were used as flux.

The **Secretary**: I might differ a little with both the President and Dr. Higgins in that which, perhaps, appears to them an axiom—that a part is not, for many purposes, equal to a whole. Now we will suppose a case. We have a ray of what we call white light, which we know is composed of primary colours, or that it can be decomposed, showing that it contains blue, yellow, and red, which have very slow actinic force, possibly retarding also the other rays. Suppose that we can take from that white light the red and yellow, is it not fair to suppose we gain, instead of lose? Another case. We all know that certain acids will act as corrosive agents upon certain metals; that these acids are made of exactly the same elements in different proportions. Now, if the whole will accomplish a certain thing, why do we vary those elements, and leave a part of one element out, and put in a greater proportion of another? If these proportions are not fixed pretty nicely, the action is very materially modified; and I believe there are parts or portions in a ray of what we term white light which have a retarding instead of an accelerating influence in photographic work. A series of experiments, concluded many years ago, plainly indicated to me that such was a fact.

The **President**: This matter was pretty thoroughly investigated by a committee of this Section several years since. It was brought to the immediate notice of the Section through the introduction of a paper by a scientific gentleman, Mr. Gutzlaf, residing in Bahia, S.A., and brought here by Mr. Gaensli. This gentleman had gone through a very elaborate series of experiments with different coloured pigments—red, orange, and yellow, to ascertain the correctness of the theory of Edmund Becquerel, which up to that time had been received by scientific men in the main as correct. That part of it with which we have to do proceeds in this way: that the orange, red, and yellow have no actinic property or force, but contain properties peculiar to themselves, which are manifested in this wise—they have no power to educe a photographic image on a sensitive film, but when that image has been once impinged by the more actinic rays, they have the power of carrying on this action which has been set up. Now this gentleman had prepared a very peculiarly-coloured glass (I have it at my house now – Professor Tilman, Mr. Chapman, and myself were on the committee). He gave the details of the manner in which it was prepared, and claimed that it was perfectly non-actinic. He had utilized it in this way. He would take a negative with half the ordinary exposure in the gallery, place it under this coloured glass, and expose it to direct sunlight under this coloured glass for a definite period of time, which could be determined with a little experience, and the action would continue, so that, if one made a picture in half the time, and allowed it to be acted on by this light, and then developed it, he would get a fully-exposed negative as the result. This was his claim; and, when it was brought here, there were negatives brought with it to illustrate the fact. Upon investigation we found that the whole theory was a fallacy—that the light acting through that very non-actinic glass was actinic; and to demonstrate this fact I prepared a sensitive plate and covered one-half of it and exposed it under that glass to the direct rays of sunlight for five minutes, and then developed it. The part that had been exposed developed very quickly. His experiments had evidently been superficial. We took that same glass to Mr. Rutherfurd's observatory, and under a powerful condenser submitted it to sunlight for half an hour, and through it photographed the spectrum quite down to the red. I was then satisfied, and promulgated this theory—that actinism is a property of light, resident in all the rays, and manifesting its force in the ratio of the vibratory motion or wave length, but not in an unbroken scale; and I believe that this is correct. I have never seen a piece of coloured glass yet that, by its mere colour, would not admit actinic light. It is a matter of time and quality, not quantity. Expose a sensitive film under it long enough, and you will get actinism. The statement that actinism is in the ratio of the wave length requires some qualification. It was discovered that where the different coloured rays mingled, in some instances the action was peculiar. This may be best illustrated, perhaps, in the excitation of the auricular nerve by the action of the atmospheric waves. When atmospheric wave lengths of different rapidity excite this nerve, a peculiar sensation is the result, which is defined as harmony or discord. This effect is never induced by a single wave length, whether slow or rapid. In the solar spectrum, where the different wave lengths mingle, there seemed to be an analogy with that of the atmospheric waves. Actinism at such points seemed to be retarded or accelerated according to the conditions of harmony or inharmony. Therefore we concluded that the theory of M. Edmund Becquerel was not founded upon fact; and that has been one of the reasons why I have always maintained the position previously stated.

Dr. **Higgins**: The fallacy that acceleration and not retardation is produced by blue glass is equal, in my mind, to the fallacy that emulsion—dry-plate photography—is not as quick as the bath process. I see it stated in books, and universally in print, that for dry plates you must give an exposure, some say of three, and some run up as high as ten times that of bath plates. I would ask of the Secretary, who is an eminent bath plate worker, the usual time of exposure with him in his studio?

The **Secretary**: The time varies from one second to half an hour.

Dr. **Higgins**: I would ask further whether on that exposure of one second he has the development of all the intensity that he can desire?

The **Secretary**: Yes; and, in some cases, a good deal more.

Dr. **Higgins**: Do we understand that the majority of cases of exposure are on the one second or half-hour side?

The **Secretary**: I should say that the majority of my cases (not portrait work, of course) require an exposure of about fifteen minutes.

Dr. **Higgins**: On inquiring among the portrait workers, I find the usual time is about thirty seconds. With emulsion photography the usual exposure in my room is never over three to five seconds. I present for view to the Section a plate taken this morning in a well-lighted room, but no skylight, in which the exposure was less than one second; the cap was simply removed and replaced as quickly as possible. The developer was our President's weakened with water sixteen times.

The **President**: There is intensity enough. I would say that to obtain such a result with a developer one-sixteenth the strength I ordinarily use would require sixteen times the exposure.

Dr. **Higgins**: That is to show the action of the light, not as a picture. That was held a foot from the window—a diffused light, not sunlight. A similar plate made by gaslight, a foot from the flame, was placed in a printing frame. It was covered two-thirds, and exposed by counted time thus—one, two, three. There are the three exposures, just as quick as you could move them along; the whole three counts would not make a second of time. [Plate shown.]

The **President**: In reference to the new developer with the neutral oxalate of potash, I gave the formula to Mr. William Hudson, an amateur photographer, residing near Boston, Mass., to try on dry plates. In my experiments I had only used it on wet emulsion plates. I received a letter from him a few days since, stating that he had tried it on dry plates with the most satisfactory results; he had produced with it the finest negatives that he had ever made on dry plates, and had exhibited them to some experienced photographers in the vicinity, who had expressed themselves in the same way. In this connection I would say that I advised at the last meeting the use of acetic acid to acidify it. I tried tartaric acid, and found that I got a stronger negative. The negatives I had made needed strength—they were very delicate, but were not up to the strength necessary for printing; but with tartaric acid I got greatly increased strength, and all the other good properties at the same time.

Talk in the Studio.

South London Photographic Society.—At the next meeting of this Society, on Thursday, May 2nd, in the Rooms of the Society of Arts, Adelphi, Mr. W. Brooks will read a paper on "Reproduction and Enlargement of Negatives by the Collodio-Emulsion Process."

A Photographic Action.—At the Lambeth County Court, on Thursday last, the case of Fincham *v.* Armit was heard before Mr. Judge Taylor, in which the plaintiff, described as a photographer, of Dulwich, sued the defendant, Lieutenant Armit, of Craven Street, Strand, to recover the sum of £3 12s. 6d., under the following circumstances. The plaintiff being called, stated that the case had been adjourned for the attendance of the defendant, whom he did not see in Court to-day. A solicitor here stepped forward, and said that he attended to represent the defendant, who did not consider it necessary he should appear. The plaintiff continued by stating that his claim was for printing several copies of a patent screw-propeller of which the defendant was the inventor, and that the charges mentioned in the particulars before the Court were fair and reasonable charges. In answer to the learned judge as to what proof there was of the defendant's liability, the plaintiff produced several letters from the defendant, referring to the case, which he swore were in the defendant's handwriting, and which letters clearly established his liability. The defendant's solicitor said he could not dispute the evidence of the letters produced, but he was instructed that the photographs were ordered not by his client, but by a person who had pledged his credit. The plaintiff, in cross-examination, admitted never having seen the defendant, but receiving instructions for the execution of the work for which he now sued from a person who had the defendant's written authority to do so. The learned judge, considering that the plaintiff had abundantly proved his case, ruled in his favour, allowing him the costs of the adjournment.

Bigamy by a Photographer.—A few days ago, at the Hammersmith Police Court, Richard David Turnbull, a photographer, residing in Upham Park Road, Turnham Green, was placed in the dock on a charge of bigamy. Inspector Whiting, who had charge of the case, said the first wife was not present, but he could prove the second and third marriages. [The prisoner's father was here taken out of the Court, apparently in a fainting condition.] Eliza Cruickshank, the prisoner's sister, was called to prove the second marriage. She said that she was present at his second marriage, on the 19th of June, 1862. She did not know the name of the church, as the marriage took place on their way to Sheerness. They had been living together. Her brother took the woman to church to "make an honest woman" of her. She did not know whether she was alive, as she had not seen her for eleven years. She had been living with another man. Eliza Mary Dore, the third wife, who gave the prisoner in charge, said she was living with her father in Castle Road, Newport, Isle of Wight. She was married to the prisoner on the 6th of April, 1867, at the Registry Office in Plymouth. The second wife, who was in Brighton, had shown her the certificate of her marriage. She had written to the prisoner to fetch her from her father's. The prisoner said he had twice saved her life. He could not live with her, as her temper was too bad. He would sooner break stones. In cross-examination the witness said she met the prisoner at Plymouth. He came as an operator to her brother, who was a photographer. He brought his second wife with him, and said she was his housekeeper. Did not know whether they lived together. Did not know whether they had one room. The witness became excited, and requested Mr. Farman, who defended, not to question her. If she had known he was living with the woman she would not have married him. The Inspector stated that he had been informed that the prisoner had married six or seven wives. Mr. Bridge remanded the prisoner, and said he would take bail for his appearance.

Reducing Residues.—Professor Stebbing, in our Philadelphia contemporary, says:—"The greater part of photographers' residues are in the form of chloride of silver; and if photographers would give themselves a little trouble, the expense, and, above all, the loss occasioned by sending their residues to the refiners, would be saved, and the gain would amply repay a little extra care in their treatment. I propose, therefore, that all the residues be put dry into a large bottle, and a certain quantity of ordinary ammonia be poured upon them, and well shaken up every now and then. The ammonia will dissolve all the chloride. When the ammonia is saturated, decant it, and even filter it, and set it apart. Pour fresh ammonia upon the residues until all the chloride is dissolved out. It can easily be seen if the ammonia contains chloride by the following test:—Take a test-tube, pour a few drops into it, then a little distilled water; pour into it a few drops of hydrochloric acid, and a heavy precipitate will be the result if it contains chloride of silver. When all the chloride has been dissolved out, put the ammonia into a large-mouthed jar containing plates of sheet-copper. In a very short time the chloride will be reduced to a metallic state. It is then put into a crucible and melted. It can now be converted into nitrate of silver, which will be very pure, and give excellent results. As to the residues, which the ammonia has no action upon, it is well to send them to the refiners or sell them."

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To Correspondents.

Amateur asks if we can advise him where to find beautiful scenery in the northern counties of England. It would be difficult for him to travel through the north of England without finding beautiful scenery. Cumberland and Westmoreland are full of beautiful scenery—lake and mountain, river, glens, waterfall, woods—and indeed, every element of picturesque effect arranged and combined magnificently. The county of Durham and north of Yorkshire are exceedingly beautiful in many parts. There are many books published describing the picturesque parts of England and Scotland. Almost every county has its guide-book. Ask your bookseller to obtain for you what you require. He will know best as to prices and publishers. We have not tried the plates you mention, but from what we have heard they seem rapid. The coffee process, as described by Mr. Whitehouse in the Year-Book for 1877, will answer your purpose as well as any.

M. A. B.—Personally we cannot speak of the cement you mention. As a rule, you cannot with success substitute one substance for another in trying experiments. The recipe was forwarded to us by a correspondent. 2. You will note, in connection with the varnish recipe, that we never recommended amateur manufacture of varnish, and that this one is sent by a correspondent who recommended it. The addition of castor oil is presumed to prevent cracking. Filter through fine muslin, or through cotton wool. 3. As a rule, the steel plate of a rolling or burnishing machine is best kept clean and not polished, its first polish being sufficient. If it requires polishing, try rotten stone and oil.

George Pendry.—You may doubtless obtain Professor Husnik's work on "Lichtdruck" through a foreign bookseller. There are several in London, such as Trübner, Dulau, and others. The proper routine is to apply to a respectable bookseller in your town, give him clear instructions, and he will forward these instructions to his town agent, who will order through the foreign bookseller with whom he deals, and in the course of a few weeks obtain the book—if it is to be had. It is quite incompatible with our duties to undertake such a task.

J. Simpson.—The reason why the lenses of the makers you name are higher in price than others is simply that they are better in quality. The rule obtains all over the world, and in relation to all matters, the greater excellence will always command the higher price, and is worth it. In the manufacture of lenses, to obtain the highest excellence, great skill is necessary, and very high quality of glass, together with much care. Common lenses are made of common materials, by inferior workmen, and in a very wholesale fashion, without the individual care requisite to each lens. Occasionally a common lens may turn out pretty well, but in buying a common lens you can have no certainty of excellence, whereas in the work of high-class opticians you have something like a guarantee of excellence.

I. L. I.—The mode of proceeding to ascertain the focus of a lens is quite correct; but the test as to its correctness which you have applied is erroneous. The statement of focus given in an optician's catalogue is scarcely ever given correctly. It is the *back* focus which is given; that is, the focus measured from the back glass of the combination, instead of the true equivalent focus, which would be measured from a point between the front and back lens. As a rule, a lens of six inches back focus, as catalogued, would have an equivalent or true focus of about eight inches. 2. We should say you ought to be able to make a two-inch head with a lens of ten-inches equivalent focus. But you must bear in mind that the nearer you place the camera to the object, the less depth of focus you will have with any lens. Your only mode of meeting the difficulty is to use a small stop. If you find this make the exposure too long, try the plan of exposing part of the time with small stop, and part with full aperture, as we have often explained 3. The chief advantage of a non-resident member is the satisfaction of being associated with a representative body of the most distinguished of those connected with the art; the receipt also of the Society's Journal or Transactions during certain months of the year; and at intervals the receipt of a presentation print.

E. H. Derbham.—Thanks for specimens, which are most excellent. The "New Purple 1," in little boy is an excellent tint. Of the two from the same negative, we prefer that in the tint of brown. The bisulphite makes matters safer if any insoluble compound of chrome have been formed; but we are satisfied that this only occurs when sulphate of baryta or a similar salt is present. We shall be pleased to see the prints made with the iron pigment. Thanks for sample of pigment, which we will try.

The Photographic News, May 3, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Photographers and Photographers' Assistants—Criminal Photography at the Paris Exhibition.

Photographers and Photographers' Assistants.—Probably the best idea of the requirements of a working photographer is to be secured by glancing over the advertisements which appear from week to week in this journal. The assistants who want work, and the principals who want assistants, in making known their requirements, afford a very good insight of the capabilities which are necessary in a photographer now-a-days. There is, of course, a great deal of romance always in advertisements, and in some cases a very large discount has to be taken off before anything realistic is obtained. Of course the principal desires, for the salary he offers, an assistant capable not only of operating skilfully, as it is inaptly termed, but one who has at his fingers' ends every known and unknown dodge connected with retouching, together with great artistic ability for posing and colouring. There is not the least difficulty in securing such assistants in theory; that is, advertisements may be seen from assistants, requiring places, who profess to know as much, and we presume when the parties meet they are mutually satisfied. The principal obviously never dreamt of securing an Admirable Crichton for three or four pounds a week, and the assistant probably imagined that he could not very well get a place if he were modest about his accomplishments. Going from one extreme to the other, there is the principal who, instead of advertising for a paragon, asks simply for "a young man" or "a lady," to assist him in the studio. He is more open, we think, to be worried by applicants than any other advertiser. Boys of fourteen to men of forty apply on the one hand, while, on the other, discarded maids-of-all work, and ladies in reduced circumstances, whose only accomplishment is to play badly on the piano, make up the bulk of applicants. Some people who are fit for nothing else have an idea that they can colour photographs, and produce salmon-faced portraits as specimens of skill. In fact, incapacity on the part of anybody is often supposed to be the qualification necessary to assist a photographer. His work is so easy, apparently, that anybody who has something of an appearance is suitable, especially in the reception room. All that is necessary is to sit down surrounded by specimens, to take orders, or to do tinting and spotting, the latter work being particularly easy, since, as the portrait is already before you taken by photography, it is almost impossible to efface the traces of the camera, even by the most clumsy workmanship. Photographers, however, are now perfectly aware of the fact that the reception room branch of their work is quite as important as any other, and they are as loath to depute it to any incompetent person as the posing and operating. So that the shoal of incompetents who were wont to worry photographers with requests are sensibly diminishing. Tact and experience are quite as requisite in a photographer's business as in any other, but it is very difficult to make some people understand this. By far the majority of assistants now-a-days make operating and retouching their specialities, and "operator and good retoucher" are what is most frequently met with. That the assistant's salary is not so good as it might be is attributable mainly to two causes. In the first place, he is not sufficiently versed in the science or art of photography, however well he may operate; and, secondly, photography is an art in which female labour competes very briskly, especially in the matter of retouching, upon which the assistant usually places a good deal of stress. Now a lady's hand is more likely to succeed in the delicate work of retouching than a man's, so that the manipulation of a negative or positive is as likely to be in her hands as not. A lady, too, is contented with a more moderate salary, and hence assistants who rely chiefly upon their abilities to retouch have to be satisfied with low rates of pay also. Again, in the reception room, a lady is quite equal to the work necessary to be undertaken, supposing she has business capacity and *savoir faire*; otherwise, of course, she would be of all people the most unsuitable. It is strange that in Paris, where, as everybody knows, a very great deal of business, especially when it has to do directly with the public, is undertaken by women, we often find in the reception room of large photographic studios not a lady, but a smart-looking secretary, to take instructions and twenty-franc pieces. Perhaps, when dealing with gold monies in profusion, as some of the principal Paris studios do, the presence of a serious face to receive the sums is deemed more solid and reassuring. Otherwise, it is a lady who usually presides in the reception room; but, as we said before, she should possess exceptional talents to be fit for the trust. For all this, the assistant need not fear that this domain will be encroached upon if he is efficient, and to be this, he must not only be a practical photographer, but know something of chemistry. The saving and working up of residues is a matter which has never received proper attention, and this is one of the points to which he should give particular attention. It is all very well to be cleanly and rapid in your manipulating, but if you do not know the why and wherefore of certain defects and appearances, you have only half learned your business. Insufficient fixation, lack of vigour, marble markings, streaks in the direction of the dip, pinholes, and a hundred other vexations should be known to and remediable in the hands of a competent assistant. It does not always do to throw away one's silver bath and make another. Now, too, that carbon printing is becoming more and more popular, the action of chromium salts, and the behaviour of gelatine under various circumstances, are matters with which we shall have to become acquainted. The quickening of developers, shortening of exposures, and intensifying of films, are all matters which imply more or less knowledge of chemistry; and if an assistant is ignorant upon such points, and does not know how to lessen or intensify certain reactions which occur in practice, he can scarcely expect to receive a higher rate of pay than that enjoyed by others who do not possess professional knowledge. There is yet one other branch of a photographer's work to which very little attention is given, and which sometimes makes all the difference between a good and a bad business. We allude to book-keeping. There are photographers who execute orders well and promptly, who get the work out of hand without delay, but are so slovenly in the matter of book-keeping that they never know who has paid and who has not. In the event of a customer appearing for the first time, and giving a distinct order, the money is generally taken beforehand, but subsequent orders for printing or mounting, which come in from time to time, are often forgotten as soon as executed. They have simply no system whatever, and if a customer sends for his account, it is usually a very untrustworthy affair. The book-keeping is not unusually left to the lady who undertakes the reception room, and she is probably quite unsuited to undertake it. The principal holds it below his dignity to have anything to do with books, and hence we have the slipshod method of keeping accounts that prevails in many studios. In many cases, we are sure, it would be true economy to have recourse to the assistance of a trained book-keeper, rather than preserve the hap-hazard system so frequently in vogue.

Criminal Photography at the Paris Exhibition.—One of the most interesting exhibits in connection with photography at the Paris International Exhibition, which was opened to the public on Wednesday last, is that shown by the Paris police, illustrative of the uses now made in the French capital and elsewhere of our art. A series of prints represents each *cause celebre* in which photography has been called in to aid justice. In the case of a murder, the spot where the victim was found, the surroundings, any traces of a struggle, are all reproduced by the camera, and the impressions handed to judge and jury to help them in forming a decision. Again, another series represents evidence collected in a forgery case, while a third collection includes the portraits of criminals who have passed much of their time in French prisons. We should think this would prove one of the most interesting departments of the Exhibition.

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AN INVERSE SENSITISING PROCESS.

BY J. B. OBERNETTER.*

Great progress has recently been made in our method of taking negatives, due to the introduction of the emulsion process; more especially the directions of M. Warnerke are so very exact that no one following them can fail of obtaining a successful result. Even with these excellent instructions, however, it is not an easy matter to prepare a serviceable emulsion; any one who has made bromide of silver emulsions knows what anxious work it is. For days together he may have been shut up in the dark only in the end to meet with failure; the least carelessness will spoil a day's work.

The emulsion process renders me remarkably good service in experiments for photographing individual colours. When pictures are taken through coloured glasses or liquids the necessary exposure is very long, and the negatives obtained have the great fault of never being harmonious, while coloured collodion films give the same results, with, at all events, harmonious negatives. In my attempts to take negatives for printing in colours, I have used collodion prepared and coloured in a variety of ways, but I found that the substance with which the collodion was coloured often spoiled the bath; besides which, I had the trouble of preparing several collodions, each with a different kind of salt. For these reasons I tried another plan, namely, that of reversing the whole process, and with it I obtained the best results. In theory it is very simple. I make a silvered collodion, and a bath of the bromine and iodine salts. Having carried on my experiments under a number of different circumstances, I am now in a position to make publicly known very simple instructions, which will enable any one to make further researches in the same field.

The preparation of the materials is quite easy, and the manipulations are the same as under the old process. Exposure may be continued for days without detriment, and the sensitiveness can be raised in a very remarkable degree. All kinds of pigments may be employed to colour the films without producing the least evil effects on the baths, and the negatives, when finished, are not to be distinguished from those produced by the old process.

With the same collodion I can prepare three different kinds of plates—pure silver bromide plates, pure silver iodide plates, and pure silver bromo-iodide plates. The last named possess an equal sensitiveness, and give exactly the same results as similar plates in our ordinary methods.

(1) *Collodion.*—Put into a half litre flask 5 grams silver nitrate, 1 drop nitric acid, and 2 c.c. water; apply heat, and, when the salt is dissolved, pour in 250 c.c. alcohol of 96 per cent.; then add 6 grams cotton and 150 c.c. ether. As soon as it is all dissolved, filter through glass-wool or fine flannel, and the collodion is ready. Preferably, it may be allowed to settle for some days; I have some now which is four months old, as good as new, and it will certainly keep for a long while. This collodion is the starting point of the whole process.

(2) *Bromo-iodide Plates.*—The plates are coated with the collodion as in our old process, but afterwards are laid, instead of in the old bath, in one composed of 8 grams potassium bromide and 8 grams potassium iodide dissolved in 200 grams water. The operation is just the same as that of silvering the plate, and takes exactly the same time. When it is dry I wash the plate on both sides well with water, and, if the exposure be short, I then float over it twice an eight per cent. solution of silver nitrate, or an ordinary silver bath; if the exposure be a long one I add a little glycyrine. After exposing I develop in the usual way with iron, but do not wash the plate. Instead of an acid, an alkaline developer may be used. Exactly the same results are obtained with the developing solution of iron as in the old method.*

(3) *Silver-iodide Plates.*—In working with pure silver iodide I take 1 part potassium iodide to 12 parts water; in other respects the proceeding is the same as with the bromo-iodide. These plates give good hard negatives, which are peculiarly adapted for the reproduction of line and pencil drawings; I have succeeded admirably in taking copper plate engravings with these plates. Tinting the collodion is, in this case, also quite feasible. If aniline blue, which is soluble in water, be dissolved in the sensitizer (8 grams silver nitrate in 100 grams water), and the plate thus coloured blue, a negative will be obtained which is not sensitive to the yellow, but sensitive to all the other colours, and which is therefore adapted for printing from in yellow.†

(4) *Silver Bromide Plates.*—These plates can be developed in the wet way, when they give rather weak negatives; on the other hand, with the alkaline developer, or treated as dry plates, they exhibit the excellent properties which are just described to emulsion plates. The sensitiveness can be heightened in a remarkable way, as I will describe further on, and I hope, by demonstrating the simplicity and facilty of preparing these plates, to encourage others to experiment with them.

In working with silver bromide, I use a bath of—

Potassium bromide...	1 part
Water	12 parts

The collodion is poured over the plate in the same way as the ordinary iodide collodion, and the solution of potassium bromide is used as a bath; exactly the same phenomena make their appearance as in silvering a plate. When the plate is ready, wash it in the usual way with ordinary water, and expose as usual; after exposing, it can be immediately developed, or first washed a second time. Any alkaline developer will do. I use the following:—

1.—Ammonium bicarbonate (crystallized)	20 to 25 grams
Water	1,000 „
(No potassium bromide).	
2.—Pyrogallic acid	1 gram
Alcohol	10 grams

With 100 c.c. of solution No. 1, mix 4 c.c. of solution No. 2.

The image develops in about half-a-minute, and can be most satisfactorily intensified by first washing the plate, and then flowing over it the silver solution (100 water, 2 silver, 3 citric acid), and allowing the latter to run back into a glass in which the usual quantity of pyrogallic acid and water has been placed. If the image be sufficiently intense, I fix with potassium cyanide, but, if necessary, it can be after-intensified as desired. The whole process works quite smoothly, and is sure and simple. By pouring certain sensitizers over the plate before exposure, its sensitiveness can be increased, and with the help of preservatives it can be used as a dry plate. After

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[*] *Photographisches Mittheilungen.*

[*] We used five parts iodide and one part bromide potassium to ninety parts water with an iron developer, and obtained, after washing and floating with silver solution, a good result, though not with the same certainty as in the ordinary process. Being able to use one collodion only, and to dispense with the silver bath and all its defects, is the great advantage of this new process.—*Editor of the Photographische Mittheilungen.*

[†] On silver bromide with the blue stain we have also obtained plates sensitive to the yellow.—*Editor of the Photographische Mittheilungen.*

being bromised, the collodion film can be stained with any colouring material which is soluble in water or alcohol. Development has never failed with me. The wet plate, if coated with thin gelatine, can be exposed for a whole day without inconvenience, and, if dried, it can be used in the same way as a dry plate.* By adding half per cent. tannin or morphine to the glycerine the plate will become sensitive again, but is liable to fogging; this fault can, however, be corrected by the addition of potassium bromide to the developer.

The sensitiveness of the plate can be increased to a surprising degree by flowing over it a solution of—

Silver nitrate	5 grams
Water	100 ,,

This solution must be neutralized with caustic ammonia, until a very slight cloudiness is left, and then filtered. In this experiment I would recommend great care with the source of light, or fogging is unavoidable. The film can be stained with any kind of colouring matter, without injury to the subsequent development. After exposure, the plate is again washed and developed in the alkaline way; it is fixed with potassium cyanide. The image may also be intensified to any required degree subsequent to fixing.

These negatives possess the peculiar character of silver bromide plates developed by an alkali—that is to say, they give perfect detail even in the deepest shadow, without quite covering in the whites. On the whole, they have all the advantages of bromide emulsion plates; in fact, they are quite the same, except that we have not the trouble of preparing the emulsion. Many improvements will no doubt be effected by alterations in the details of the process. I can only express a hope that those who take up and study the subject further will also make public any modifications that they can recommend.

HISTORICAL SKETCH OF PHOTOGRAPHY.

BY PROFESSOR CHANDLER.†

The second of the course of lectures before the Academy of Sciences was delivered last evening in Association Hall by Professor C. F. Chandler, before a large and appreciative audience. The subject of the lecture was "Photography," and Professor Chandler, in describing the early history of the art, said photography is the act of producing pictures by the aid of light acting upon chemically prepared surfaces. The name is unfortunate, as it is not the light or the luminiferous principle of the sunshine which accomplishes the result. The proper name would be heliography, or sun writing, which was applied by Niepce to the process he invented in 1827, as more proper, but which has not been generally adopted.

The action of the sunlight in effecting chemical changes, such as vegetable colours, was noticed at a very early day, and it is now a well-known fact that it is to the chemical rays of the sunlight that every leaf and every blade of grass owes its chemical activity, which enables it to feed upon the water, the ammonia, and salts, and elaborate in the great laboratory of nature, the vegetable cell, the innumerable principles which are to serve as food for the animals, and, after their being assimilated and organized into animal tissue, are to give out the power or force which they derive from the sun, which appears in every motion and every involuntary and voluntary act of the animals. If it is true, as has been stated, that the Egyptians employed an indelible ink, prepared with nitrate of silver, in marking their mummy cases, they must have been fully acquainted with the effect of sunlight in blackening silver salts in contact with chemical matters. Dr. J. M. Hooper, in his *Rational Recreations*, published in 1774, gives a method of writing on glass by the rays of the sun with silver salts, employing a proper stencil for the purpose. Dr. Draper attributes this experiment to Priestley. In 1777 Scheele called attention to the effect of light upon silver salts, and exposed a paper coated with nitrate of silver to the solar spectrum, obtained by passing a beam of light through a prism. He found that the action was greatest at the blue end of the spectrum, and that it continued even beyond the visible spectrum, while no change took place in the green, the yellow, orange, and red portion of the spectrum, thus demonstrating the fact that the rays which produced chemical decomposition were not identical with the luminiferous rays, and that they are most abundant at the more refrangible end of the spectrum. It has been claimed that Matthew Boulton and his partner, James Watt, actually obtained sun pictures at their works in Soho, near London, as early as 1799, perhaps even before 1791; but the evidence is somewhat uncertain.

The First Imperfect Sun Picture.—The first well authenticated attempts to produce pictures by means of the sunlight were made in 1802 by Thomas Wedgewood, the youngest son of Joseph Wedgewood, and Sir Humphrey Davy. They moistened paper with nitrate of silver, and exposed it to sunlight under leaves and paintings on glass, such as are used in magic lanterns. They even took profiles. Davy succeeded in obtaining pictures with the solar microscope, but neither of these chemists was able to prevent the unchanged portions of the picture from becoming coloured when they were exposed to the diffused light; consequently their pictures were preserved in dark closets and examined with the aid of a candle. In 1814 Joseph Nicephore Niepce, of Chalons, studied the action of light upon asphaltum and other resinous bodies. He coated metallic plates with asphaltum, and then exposed the image in the camera-obscura. The asphaltum was rendered insoluble by strong lights, while in the shaded parts of the surface it retained its solubility. By washing it with oil of lavender, the unchanged asphaltum was removed, and the metallic surface exposed was etched with the acid. Finally, in cleansing the plate, the etching was obtained, from which pictures could be printed in printers' ink.

The Daguerrean Process.—In 1824, Louis Jacques Maude Daguerre, of Brie-on-the-Marne, began experiments, seeking to fix the pictures in the camera which he produced with chloride or nitrate of silver for his sensitive salt. He does not appear to have been any more successful than Wedgewood and Davy. In 1827 Niepce communicated his process of heliography, or sun sketching, to the Royal Society, exhibiting some of his prints from the etched plates I have just alluded to. This led to his acquaintance with Daguerre, and they continued their investigations together until the death of Niepce, in 1833, and from this date the work was continued by Daguerre and Isador Niepce, the son. In January, 1839, Daguerre announced the discovery of the beautiful process which bears his name, and which took the world by surprise. When the word was first brought to this country that two French chemists had succeeded in fixing the image seen in the camera-obscura indelibly upon a silver surface almost every one was incredulous. The moon hoax, which was published in the New York *Sun* in August and September, 1835, which gave most graphic descriptions of what Lord Rosse had seen with his great telescope at the Cape of Good Hope, and from which it appeared that the moon had a vast population of human beings, whose habits, manners, and mode of life was so graphically described by Locke, was still fresh in the minds of most Americans, and they looked upon the discovery of Daguerre and Niepce as simply another effort of Mr. Locke or some other equally ingenious writer.

Professor Draper's Experiments.—There was one man, however, in America who was not incredulous. John W. Draper, of New York, had been investigating the action of light, and had used pieces of paper rendered sensitive with silver salts in his investigations. He was quite prepared, therefore, to believe in the possibility of achieving all that Daguerre claimed, and immediately began experiments upon the meagre information which came with the first announcement of the discovery. Not only was he successful in accomplishing all that had been claimed that Daguerre had done, but from his knowledge of chemistry, and familiarity with optical apparatus, he was able to make important improvements in his little laboratory in the university.

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* This direction we have followed with the best results.—*Editor of the Photographisches Mittheilungen.*

† *New York World.*

Further Processes Described.—After elaborating somewhat further the history of the various processes which have been introduced from time to time, the lecturer alluded to the painful experience of the early sitters in Dr. Draper's laboratory, where the first Daguerreotypes of the human face were taken with their faces floured and blue light streaming down upon them for fifteen or twenty minutes. He then gave a description, illustrated by specimens, of each of the new important processes. The Daguerreotypes which were so extensively taken twenty or thirty years ago were exhibited, and the processes by which they were produced fully described. The Daguerrean process, he said, had recently been revived in Brooklyn by the skilful operator, Frank Pearsall, and with very great success. Some of his pictures by this process were exhibited by the lecturer.

Talbotypes Explained.—He next described what was meant by Talbotypes, invented by Henry Fox Talbot in 1839, and some of these were exhibited, the lecturer having been fortunate in securing a series both of negatives and positives from Mr. Rupp, of this city, who procured them many years ago at Frankfort-on-the-Main. These pictures were especially interesting, as they first suggest the idea of a negative for preparing a positive; and although, owing to the imperfections of the paper, and the fact that much had yet to be learned, they were not very beautiful, still they formed one of the most interesting topics of the lecture.

Photographs without the camera were next exhibited—ferns impressed upon sensitive paper after the methods employed by Davy and Wedgewood, but rendered permanent or fixed by the use of hyposulphite of soda, a process which the lecturer said these distinguished chemists would have given a great deal to have known.

Collodion Pictures.—Collodion pictures were next noticed. Herschel had endeavoured to make use of glass plates coated with silver salts for the production of negatives as early as 1840; Niepce de St. Victor first succeeded in using them, employing a film of iodide of starch, sensitized with nitrate of silver. Later, in 1847, he used iodized albumen films, but it was not until Schonbein discovered gun-cotton in 1846, and its solution in alcohol and ether, called collodion, was introduced by Scott Archer in 1851, that photographs now prepared with the aid of negatives became of any importance. This process has now become the key to all the various processes employed for producing silver prints, carbon prints, Albertypes, heliotypes, photographs, electrotypes, lithographs, and engravings.

The processes with collodion were described by the lecturer in detail. Negatives were taken before the audience with the aid of the electric light, and were then fixed in their presence, and with them glass positives were at once printed. A beautiful series of very large silver prints was exhibited and explained, as well as a silver print of the moon, photographed by Mr. Lewis Rutherfurd, of this city, and also the moon photographed by Dr. Henry Draper, and with it the photograph of the solar spectrum and his latest photograph, proving the presence of free oxygen in the atmosphere of the sun. Large solar prints by Golder and Robinson were also exhibited, as well as micro-photographs from Philadelphia.

A series of transparencies photographed by Mr. Landy, the assistant in chemistry at the School of Mines, was shown in the magic lantern. These, the lecturer said, were extensively used at Columbia College for illustrating the lectures.

Autotypes.—Professor Chandler next called attention to gelatine transfers, called "Autotypes." This wonderful process, he said, was invented by Swan, of Newcastle, England, and had been brought to a high state of perfection by Leon Lambert, of Paris. The subject was illustrated by a complete series of specimens, beginning with a silver negative, and ending with a finished picture made by Lamson, of Portland, who received the prize for this class of pictures at the last public exhibition. Specimens of these pictures, by Rockwood, of this city, and Adolph Braun, of Dornach, Germany, as well as a beautiful series of transparent gelatine transfers for the magic lantern, by Levy, of Paris, were shown. Pictures in Prussian blue, prepared by C. L. Landy, were next exhibited and explained.

The Albertypes.—The Albertypes, the invention of Albert, of Munich, were next explained in detail, and a fine series of specimens, some prepared by Albert himself, and others by Edward Bierstadt, of this city, were shown. This process, the lecturer said, begins with the silver negative, from which the gelatine relief is produced, which is placed in the printing press, and will deliver four hundred impressions a day in printers' ink, which cannot be distinguished from the best photographs in silver. This process possesses one great advantage over almost every other process in which printers' ink is employed, in that it does not depend upon the picture possessing lines, but will yield from any good negative of the human face a most beautiful and highly satisfactory picture in printers' ink.

Producing Pictures in Colours.—Perhaps the most interesting feature of the lecture was the Professor's announcement that Albert, of Munich, had succeeded in producing pictures in colours by the aid of this process. By the kindness of Edward Bierstadt, he said, he was able to exhibit pictures in three colours, produced by the aid of the photograph, by Albert, of Munich. The principle was, after all, very simple. The coloured picture or landscape is thrown into the camera through a coloured screen. It excludes all that is yellow and all that is red. There is thus produced a silver negative of everything in the picture which is blue. This is transferred to the Albertype plate with the aid of blue ink, and all the blue parts of the picture are printed upon the paper. The experiment is then repeated, except that by the use of a different screen and an Albertype plate of all that is yellow in the original picture is secured from this with yellow ink, and the yellow parts of the picture are printed upon the same sheet of paper. The third Albertype is then prepared in the same manner for the red portion of the picture, and these in turn are printed upon the same sheet of paper in red ink. Thus the Albertype is produced by the combination of the three primary colours, which faithfully presents the contents of the original picture. The specimens exhibited by the lecturer were truly remarkable.

What the Woodburytype is.—The Woodburytype was next spoken of. In this process the gelatine film is produced from a silver negative, is afterwards dried, and forced by hydraulic pressure to make its impression over a thick plate of lead. From this plate, in a proper press, pictures in gelatine, coloured by pigment, are actually moulded either on glass or paper. Specimens of both kinds were shown, which, for their colourings and brilliancy, were remarkable.

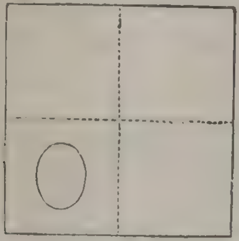
The next process explained was the photogravure, which, Professor Chandler said, carried the same principle one step further. The leaden plate is subjected to the galvano-plastic process, and an electrotype copper-plate is produced, which is then placed in a printing-press and employed in printing pictures in ordinary printing ink. A beautiful series of pictures prepared by this process by Goupil and Co. was astonishing for their very large size, some of them being three feet by four, and also for their beautiful brilliancy and clearness.

Photo-Engraving.—Photo-lithography, photo-electrotypes, photo-zinc etchings, and photo-engraving were fully elaborated by the lecturer. In relation to the latter, he said, it seemed as though the photo-lithograph and the photo-electrotype had reduced the art of reproducing the work of the artist ready for the printing-press to its simplest expression, but photo-engraving carried it in point of cheapness to the verge of absurdity. He showed a steel engraving of a beautiful Magdalene, a silver negative and plaster mould a stereotype plate and copper electrotype, all ready to adorn the page of any of the daily papers, and said that when the engraving was produced, and placed side by side with the original, it was almost impossible to decide which was the ten dollar steel engraving and which the ten-cent or perhaps five-cent reproduction. At the conclusion of his lecture, Professor Chandler was heartily applauded.

SEVERAL PICTURES ON ONE PLATE.

BY H. W. BROWN.[*]

In my work I have invented a very simple means of producing several pictures on one plate (the same as those produced by a combination of gem tubes), with a single tube camera. It costs only about five minutes' work, and works like a charm when done. Here it is :—Cut a piece of pasteboard just the size to fit tight in the camera, closely in front of the ground glass or plate-holder. If you want four gems on a one-quarter plate, cut an oval in your card just in front of (say) the lower left quarter of your plate. Now make your exposure, and turn your card from left to right, and make your exposure on the lower right quarter of your plate; now turn it from bottom to top, &c. In this way, with one or more cards, you can make as many gems on a plate as you want to. It will be found particularly useful in taking pictures of the little folks. This may have been known to many of your readers, but as far as I know it is original.



THE INTENSIFICATION OF NEGATIVES.

BY DR. JULIUS SCHNAUSS.

Among intensifiers the compounds of mercury have always played an important part. The use of mercuric chloride has been almost entirely given up, because its action is so unequal. A solution of that substance may be used in nearly a concentrated condition after first fixing, and carefully washing the negative, when its action will be sufficiently slow to allow of the intensification being watched; but large plates will almost always show white spots, particularly where the collodion has not run evenly, and where consequently the image film is thinner. According to several authorities, a plate which has been treated in this way, and has turned nearly white, should have a dilute solution of ammonia (one in eight) pour over it.

A solution of corrosive sublimate is much better than one of the red mercuric iodide in potassium iodide; this does not reduce the colour of the negative, and acts much more equally. It is prepared easily by dropping a solution of mercuric chloride into a concentrated solution of potassic iodide, and keeping the mixture constantly stirred; the red precipitate of mercuric iodide, as it forms, instantly dissolves in the excess of potassic iodide, and the operation must be continued until it ceases to dissolve. The solution must then be diluted with from five to six parts of distilled water, and filtered; of course it contains potassic chloride, but it will be found that that compound does not injuriously affect the intensification. In this process the after treatment with ammonia is not necessary.

Every negative which has been intensified with a salt of mercury has the unpleasant property of darkening after pigment printing; I have also often observed the peculiar phenomenon that the silver paper on which the print is taken has had a greenish colour communicated to it by contact with the mercuric film, especially when the printing has taken a long time under a bad light. It is therefore advisable to limit the employment of all the salts of mercury in intensifying to cases where the print is to be taken on chromatised paper, and then only once from the same negative, as in photo-lithography and photo-zincography.

Intensifying by means of the alkaline sulphides, at one time so much liked, is not recommended, on account of the liberation during the operation of hyposulphuric acid, a gas which is not only noxious to health, but also detrimental to all photographic manipulations.

The method of giving intensity to the image by means of a salt of lead, which is due to Messrs. Eder and Toth, has been frequently discussed in the different photographic journals. For its successful employment it requires great care and attention, on which account it has not been so largely introduced into practice as it deserves, nor is it so much adopted as intensification by means of iodine and other methods. Briefly described, it is as follows :—The negative must be developed with iron only, and fixed with sodium hyposulphite; afterwards, it must be frequently washed, the last time with distilled water. The intensifying bath, into which the plates, while still wet, must be plunged for some minutes, consists of—

Red prussiate of potash	6 grams
Nitrate of lead	4 ,,
Distilled water	100 c.c.

They are then taken out, and well washed in distilled water, until a drop of the wash water does not yield a blue colour with a solution of iron sulphate. The different precautions which must be adopted in this method I will not now stop to consider: they will be found described at length in the *Photographische Correspondenz*.

A method which can be strongly recommended is the use of iodine in giving intensity. It can be effected in two different ways, according as the negative has been already varnished or not. In the former case, the varnish must be first removed by repeatedly pouring over the plate warm alcohol of 90° Tralles. A solution of 1 part of iodine in 150 parts alcohol of the same strength is then flowed over the plate, which under this influence will darken very sharply: the operation must therefore be conducted with great care. After letting the alcohol solution of iodine run off the plate, the latter can be again varnished. The strength of the iodine solution should be in proportion to the desired degree of intensity.

If the negatives have not been varnished, an alcoholic solution of iodine must not be used; in that case a solution is made of 3 parts iodine in 6 parts potassium iodide, the latter having been previously dissolved in 100 parts water. An old solution of this kind will act better than one newly prepared. The image must be developed by repeatedly pouring on the plate a solution of iron mixed with a small quantity of one of silver; it must then be well washed, fixed with a diluted solution of potassium cyanide, and again very carefully washed. A sufficient quantity of the above solution of iodine in potassium iodide is now floated over the plate, and allowed to act until the negative shows a yellow colour also on the glass side. After again washing, the plate is intensified with the usual citric and pyrogallic acid solution containing a little silver, during which operation daylight is allowed to fall on the plate. It is then once more washed.

There are several other perfectly reliable methods of obtaining intensification of the photographic image, as, for example, that of Selle, by means of red prussiate of potassium and nitrate of uranium; also those by means of salts of the precious metals gold, platinum, and palladium. I will not now further discuss these methods, as the same object can be attained by those already described.

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[*] *Philadelphia Photographer.*

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A REVOLUTION IN PHOTOGRAPHY.

We do not, as a rule, give any attention to commercial announcements connected with photography in this portion of the Photographic News. But we occasionally meet with statements so startling that we should feel we were failing to chronicle an important revolution in the history and practice of the art if we passed them over without notice. A circular before us announces the existence of a new dry plate which is four times as sensitive as wet collodion! And as the name standing sponsor for these plates and their claims is that of one of the most highly esteemed chemists who have devoted themselves to photography, the startling claims demanded will receive general attention. As the practical discoverer of carbon printing, Mr. Swan's name will always be gratefully remembered by photographers, and if the plates he has just announced to the public turn out all that he believes them to be, the revolution in the negative process will be as great, or greater, than that effected by carbon in printing.

Hitherto, with the majority of dry plates, it has been a recognised maxim that they were unsuitable for use in dull light, as although they would give excellent results in a good light with an exposure of from three to six times more than was required for a wet plate, if the light were dull they would fail to yield a good negative with any exposure. The claim made for these new plates is, however, that they will be especially valuable for interiors, and for use in dull light, where success with ordinary wet plates would be impracticable. Besides the amazing sensitiveness claimed, great certainty and high excellence are also enumerated amongst the qualities of the new plates, which seem, as we have already said, to establish a revolution in photography.

Dry plates have hitherto been regarded as slow plates, and it will be difficult to convince many photographers of the contrary. But with the most enthusiastic dry plate workers, the idea of leaving wet plates so far behind in sensitiveness has rarely been dreamed of. Col. Wortley has repeatedly inaugurated a friendly tournament of wet and dry plate workers, and has on more than one occasion demonstrated that his uranium emulsion plates equalled or surpassed wet plates in rapidity. Mr. Kennett has often declared that dry gelatine plates were much more sensitive than wet collodion; but he has, we fear, rarely obtained credence. Mr. Mawdesley has of late called attention to the Bennett plates as possessing rare sensitiveness, and has shown negatives of interiors illuminated only with artificial light produced by them. But as similar results have been produced on wet plates, this was not startling. The deliberate claim of a sensitiveness four times greater than that of wet plates, made by a gentleman not given to exaggeration, is to us really startling.

The proof will doubtless soon reach photographers as the result of trials by many able photographers. The chief drawback is the very precise condition of darkness or non-actinic light in which the plates must be developed. We are promised some of the plates for trial, and we shall probably report upon them, at a convenient time, after we have submitted our dark-room to the conditions of unusually subdued illumination demanded as necessary. How far these plates meet the conditions of the Paget competition in keeping before and after exposure is not stated. For studio work, in place of wet plates, for which they are recommended, such keeping qualities are little needed; but for tourist work these qualities will doubtless be required, and time must prove whether they exist or not. In the meantime, in the interest of the progress of the art, we hope to find the attainment of this rare sensitiveness proved by many experimentalists.

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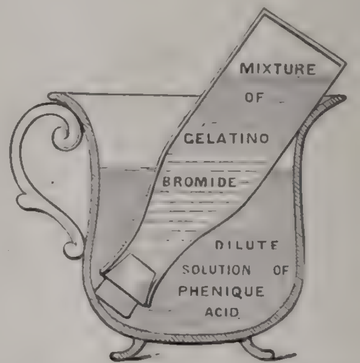
PRESERVING SENSITIVE EMULSION.

A simple and efficient method of keeping gelatine emulsion without risk of decomposition, or of loss of sensitiveness, will be hailed with satisfaction by many experimentalists. The addition of alcohol, as was recently stated by Mr. Foxlee, at the South London Society, proves efficient in arresting decomposition in gelatine; but a misgiving evidently existed in the minds of those who had tried alcohol as to whether the emulsion was benefited in other respects by the addition, some loss of sensitiveness having apparently been experienced. We have just received from an old and esteemed correspondent, Captain Roger Laurent, aux Forges, des Basse Indre, Loire Inferieure, a simple, ingenious, and efficient method of preserving the emulsion from decomposition without any addition which can interfere with its working properties. We reproduce his letter at length. He says:—

"I have always thought that a subscriber to a scientific journal ought to bring from time to time his little stone to aid in completing the common edifice. Some of your readers appear to find it difficult to preserve the emulsion of gelatino-bromide of silver. It may be managed very simply. The gelatine emulsion, having been dissolved over a water bath, is placed in a bottle carefully stopped: it is then placed, corked mouth of the bottle downwards, in a vessel containing a very dilute solution of carbolic acid. I have some which has been kept for three months in this way, which is as good as on the day when it was made. It is only necessary to place the bottle in warm water to re-dissolve the emulsion, and it is ready for use like collodion. It may be replaced again in the solution from time to time indefinitely. Of course, the vessel in which it is immersed must be kept in the dark room."



THE PROPOSED SUMMER EXHIBITION OF PHOTOGRAPHS.

Some time ago we called attention to a proposal of Mr. Bassano, of Bond Street, to give up certain large galleries in his establishment in Bond Street for the purpose of holding an exhibition of photographs during what is known as the London season. The proposal was so liberal and the arrangements so inviting that we cordially wished success for the scheme. We regret to learn, however, that it has not been met sufficiently heartily by photographers to justify Mr. Bassano in carrying out the project, the number of photographers accepting the project and undertaking to exhibit not exceeding thirty. Unless, therefore, a large accession to that number be at once made, it is clear the project must be abandoned. We regret this issue, the more so that we are satisfied that a summer exhibition would be beneficial to photographers and their art, but also that many photographers believe this; professional jealousy and distrust being the chief cause why this chance has not been accepted.

The following is a copy of Mr. Bassano's letter to those who had accepted his plan and intended to exhibit:—

"Dear Sir,—I regret to inform you that it will not be practicable to form the proposed Exhibition of photographic portraiture, &c., this season, the number of gentlemen who have promised to exhibit amounting only to thirty; it will be seen, therefore, that unless a greater number than these could be obtained, the Exhibition would scarcely assume the character of a representative one, which was the chief object aimed at. Nevertheless, should I, however, obtain a sufficient number of promises during the year which would warrant me in considering that an Exhibition might be opened, which would represent the progress of our art, I will communicate with you, and shall be happy, in view of this, with your permission, to retain your name upon the list as a probable exhibitor.—I am, yours faithfully,

"J. Grant, Sec. to A. Bassano.

"25, *Old Bond Street, W.*, 25*th April*, 1878."

TO PAY, OR NOT TO PAY.

BY NORMAN MAY.

This, though a question of paramount importance to photographers, is one that, commensurate with its interest, has had comparatively little space devoted to it in the photographic journals.

A short time since, in a conversation with a photographer who for many years has conducted his extensive business on the strict prepayment principle, he said:—"It was an anxious time starting this system in a town where it was new to the great majority of people; but my book-debts were getting enormous—bad ones, too, some of them were—so I determined to at least try the prepayment system fairly, and I am pleased to be able to say it quite came up to my expectations, and everything goes on now to my satisfaction in every way. I must say some few people, possible customers, went away at first, but, after all, it's a great question whether we are not better off without such unreasonable people's custom; and though, at the beginning, we did not seem to have quite as many sitters as we were used to, yet at the end of the day the cash would be as much or more; and so it went on—the end of the first year came, the accounts were better than I expected, the second year still better, and every year it still increases. There is not half the bother with the customers that we had before we went in for strict prepayment, and we have the additional satisfaction of knowing that we are never working for nothing; and I believe if anyone is paid beforehand he will take more pains, and feel more in honour bound to turn out excellent work, than if the remuneration was a matter of doubt. Those who think of exacting prepayment would do well to ask themselves the following questions: firstly, 'Have I the capital to keep me afloat for awhile?'; secondly, 'Can I turn out work to equal, if not excel, that of my competitors?'; thirdly, 'Have I health, strength, and energy?' If he possess these things, he can go ahead without the slightest fear of the result. A short time ago, a gentleman, whom I would credit for everything on the premises, sent down his things and came to be photographed, but, on learning my invariable practice of prepayment said he objected, on principle, to paying beforehand. Well, I objected, also on principle, to take him without being previously paid, and the consequence was, though he's a friend of mine, he sent for his things, and has not been taken. He doesn't feel any illwill, I'm sure, as he has been in the shop and made purchases since; and it wasn't that he doubted the quality of the photographs, but it was the principle he didn't like. Of course it was rather annoying, but one must make up his mind that it won't be all smooth sailing."

Now it seems to me that the above-mentioned questions contain the whole gist and substance of the arguments "Have I the money to keep afloat awhile?" Money certainly is a great requisite, not only enabling the possessor to withstand dull times, but purchasing the best of instruments, commanding skilled labour, fitting up the most convenient and imposing building, and relieving, in a great measure, the mind from the pressure of anxiety. Certainly capital should have a prominent place in the calculation, as it purchases and allows for the thousand and one things that the non-capitalist sighs for in vain.

Next comes the question of good work. Now this is rather a hard one to answer, for a great many photographers are apt to overrate their own productions, and undervalue those of their opponents, thinking only of the best specimens of their own work, and of the vilest failures of their neighbours. Almost all photographers are prone to do that, as their own "duffers" are a theme they care not to dwell upon, the prints being hardly glanced at, and the memory thereof being consigned to oblivion as soon as possible. It's not always the man that has the best specimens that succeeds the best, even though he did them himself; it is the average work that tells in the long run.

"Health, strength, and energy." Those are fine things—necessaries, in fact, though dependent in a great measure on the former qualifications for perfect success. Ill health is a thing generally beyond our own control, therefore we must put up with it, and can only make the bes of existing circumstances relating to that question. Tht importance of energy is so obvious as to need no commente

The photographer mentioned above is in business in a large town with a great floating population, largely consisting of naval and military men, who are notoriously "ticklish customers."

Whether the system of prepayment exclusively would pay in a small town dependent in a great measure on the neighbouring resident gentry, or in an old cathedral city extensively patronized by the clergy, is a query, though clergymen, according to my experience, are no more to be trusted than other people—not so much, in fact.

In a large busy town, the photographer could hardly be expected or supposed to know everyone, and therefore would not be so likely to offend by a request for the cash, as in a small place, where every person of any consequence is supposed to be, and generally is, known, and who are often surprised at the demand, however politely worded.

It is much easier, I think, to start a new business with entirely new customers on the prepayment basis, than to alter the old-established rules of an existing one (though the instance cited shows that the latter can successfully be done), and some customers, if not cash, would be lost at first by the change, unless the work is exceptionally good. After all, that lies at the root of the whole matter. If the photographs are better than anyone else supplies in the neighbourhood, not the slightest fear should be entertained as to the ultimate result: the people will come, prepayment or not.

I do not say that a first-class photographer would be "bound" to succeed better than his artistically inferior rival. Business ability is an important factor that must be taken into consideration; but if a man is not only a first-class photographer, but a tolerable business man, prepayment would not be a stumbling-block. Photography differs from many businesses—or professions, if you would rather have it so—inasmuch as, generally speaking, every transaction is complete in itself for small amounts, and no running accounts are kept, as probably the same individual will not require anything more for months, perhaps years, and the expense of booking and sending bills for such small sums really amounts to more than the profit on the order originally would have been. It must be remembered that though less business will be done, perhaps, or seem to be done, if prepayment is enforced, the success of a business is not reckoned so much by the quantity of goods sold or work done, as by the profit accruing from such sales, and it is much better to do a smaller and therefore less expensive business for cash, than to execute a great quantity of orders a proportion of which will never be paid for, and others which will only be paid for after a considerable time has elapsed. The expenses of a strictly prepayment business will be much less than of one conducted on a more lax system—that may be taken as an accepted fact.

If photographs are paid for before sitting they are generally more satisfactory, or, at any rate, there are fewer resittings, and there would be received no such communications as the following:—"Miss —— regrets exceedingly that all the proofs, which she returns, are so unsatisfactory, and is sorry she will be unable to sit again. She is the more disappointed, as from Mr. ——'s reputation she expected something better." This, adding insult to injury, is a fair sample of a class of letters that many photographers are troubled with; and what can they do? The customer lives at a distance; the amount is small, and not worth suing for in the County Court, his only remedy. He has lost not only a customer, but his cash, and has, practically, no remedy.

If the photographs are paid for, the customer is bound to sit again, or be satisfied with what she has. I say she, as it's almost invariably the fair sex who trouble us with resits, generally the dress being at fault, and not the photographic qualities of the picture; but the photographer gets blamed for it all the same, and therefore loses, not only his cash and customer, but his reputation, as one photograph that is considered bad does more harm than half-a-dozen good ones do good.

There are several ways of asking for the cash. The bullying way would not be likely to succeed in any but the lowest class of business. The young lady assistant who has charge of the department for taking orders is about the best one for the purpose. The proprietor himself should never do it, as customers may think that, for some reason or other, he is making an exception not in their favour; but if the assistant asks in a polite, but firm, business-like manner, people will easily understand that it's the rule, and therefore will not be likely to be offended.

It's a bad practice to have to call the principal to back up the legitimate demands of the assistant; better lose the customer, and save your own and assistant's credit. If the assistant is not polite enough, or firm enough, it will pay better to get another more suitable, than to run the risk—and that it's a great one I know by experience—of offending by asking for the cash yourself. Printing the rule in prominent type upon the price lists is a plan that saves many after-squabbles, and is in general use among a very large number of photographers. The plan of having cards, labels, &c., in the shop or reception room is familiar to every one.

This subject is so important that it is far from being exhausted in a short paper, and many, besides myself, would be interested in others' experience as to the success or non-success of the system.

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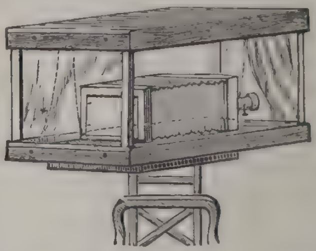
COPYING IN HOT STUDIOS.

BY J. H. CORSCADEN.

When copying in very hot and ill-ventilated studios, and long exposures have to be given, the plate will have become dry in parts, and when developed will be filled with stains and marks. It is true there are several other methods to remedy this annoyance; but as the old proverb teaches us that a preventive is better than a cure, I have endeavoured to supply the former. I make a good strong wood case something in the form of a camera, but no sides or ends. I fit two flat tanks (zinc) in the top and bottom, which I fill with cold water and a small quantity of hyposulphite of soda. There will be six inches deep of ice cold water, which will repel the rising and falling heat, and keep the camera cool and steady. The sides are hung with waterproof canvas, which run on rods, and can be drawn when in use, which will also repel the heat in like manner, and as it does its work so well, and is not an expensive contrivance, I have much pleasure in recommending it to those who are troubled with a hot studio.



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THE ART OF DESIGN.

BY J. MARTIN.

Death too often causes the complete disruption of a circle so complete that its component parts are scattered abroad, never to be re-united. My sad loss is a fitting example. It is at every period of life difficult to form new associations and adopt new habits and manners, more especially at the advanced age of seventy-two, and it requires time to find proper assistance to carry on any undertaking; and this latter has been the principal cause of my long silence; but I hope now to be able to resume my contributions to the Photographic News.

I promised in my last to extend my suggestions as to the best method of obtaining a knowledge of the art of design, and therefore proceed. One of the greatest difficulties the pupil will have to encounter, especially if he has practised much penmanship, will be the making of a vertical, or perfectly upright, straight line, but will find them all have a tendency to lean to the right hand, in the same way as his letters. The readiest way to test their correctness will be to turn the slate or paper on which he is making his efforts upside-down, when he will, if the lines are not upright, most likely see that they lean to the left hand. Having made some progress, rows of such lines should be attempted, and the proof of their correctness will be that they appear equidistant from each other through all their length. Of course his next lesson will be the making of oblique lines leaning to the right and left hand, and repeating them in rows as before. Then follows the combination of these lines into simple forms, either square, oblong, or pyramidal, and these various figures should be correctly true. Then will follow the formation of curved lines, and their repetition and combination with those which are straight.

When the pupil has advanced thus far, it will be better that he should obtain some good elementary copies of simple forms. Such may be obtained of any stationer, for they are published by Government for the use of their Schools of Design. It is also excellent practice to attempt to draw the outlines of simple objects of furniture, such as a writing desk, chest of drawers, vase, &c., placed in various positions. While thus progressing, the pupil should accustom himself to call all geometrical figures by their technical names. This course will serve to initiate him in the outlines of geometry. As soon as the pupil is tolerably proficient in forming simple figures, he should proceed to attempt drawing the outlines of solid objects—that is to say, objects possessing length, breadth, and thickness. I have not unfrequently seen really well coloured drawings which showed that this universal law had either been entirely misunderstood or neglected, making the performance, otherwise creditable, entirely valueless. It will be best for the pupil not to make any attempt to shadow any object until he has made considerable progress in forming a correct outline.

The commencement of studying the outlines of the human figure is best attempted by drawing the features of the face from good copies, life size, and the hands, feet, and limbs; and he should obtain a tolerable facility in copying these entire heads before attempting to complete a figure. The study of anatomy will greatly assist the pupil in obtaining a knowledge of the proper proportions of the human frame; in fact, I should say it is indispensably necessary, for unless he can distinguish between the different proportions of an ape and a man, he will be as likely to draw one as the other

ON BURNISHING PHOTOGRAPHS.

BY J. H. SCOTFORD.[*]

When the burnishing of photographs first came in vogue we remember with how great reluctance photographers with artistic feeling submitted to the popular demand for their highly-finished pictures; and we need not at this late date attempt any argument, either *pro* or *con*, upon the subject.

Our observation among a large number of photographers is that but few know how to properly burnish their work, so that they may obtain the highest polish, and at the same time the hardest and most durable surface. This, therefore, induces me to write the following instructions.

In the first place, a picture that has not been mounted upon a proper mount is not susceptible of the best finish; but supposing it is properly mounted, my instructions are, first, to see that the picture is not too much dried, as all know the swell of the card when a picture is first mounted bends the picture backwards. Let the picture dry until the contraction of the paper just commences to bend the picture forward. It will be found that the picture in this stage is about three-fourths dry, and it is absolutely necessary that it should not be allowed to dry any more than this until after the picture has gone through the burnisher. This is best done by piling the pictures in one or two piles, and placing them under a weight. They should be carefully taken from this pile and spotted out, and immediately placed in another pile under weight. The same precaution should take place in applying the lubricator to the print.

They should be taken to the burnisher in this condition, and put through until a sufficient polish is reached.

The reason for this method of procedure will be evident to any one who has observed with what a number of irregular lines the surface of a picture will become broken when allowed to become perfectly dry in the usual manner. When these checks have once appeared in a picture there is no method of again uniting the broken surface, as I have repeatedly demonstrated by all sorts of experiments. When burnished by the above directions, the picture when cool will be found to be very compact and hard, and neither alcohol nor water will destroy the gloss, except by long soaking.

Another little hint I would give, on the best way to handle a picture in the burnisher. Just put the picture through the burnisher lengthways, curling it up backwards around the roller; afterwards put it through sideways, thus straightening it, and thereby a much higher polish will be secured. Always burnish with a slow motion.

If pictures are to be burnished, let them be well burnished; and if the above remarks will assist any one in this direction, their mission will be accomplished.

WHY PHOTOGRAPHERS ARE POOR.

BY H. J. ROGERS.[*]

Nature and art afford many kinds of growth, and all are more or less in harmony, and are subject to wise provisions, whether they recede or advance in growing; there is no standstill in this matter of growing. The question of financial progress is an all-absorbing one in the human mind, and well it may be, since it conduces to our temporal welfare, to the development of our credit and character, and affords us a stimulating effect to physical, intellectual, and moral accomplishments and happiness. When we "strike out" in our professional boat on the river of human life, dependent upon ourselves and the advancement of our art, is it reasonable that we should feebly sit still and let the natural current take us downward? No, friends; if we would go up stream, we must be zealous and watchful, and use extra exertions with our oars of revolution and firmness. Business methods and principles in our profession are held secondary to some theoretical or practical hobby in the manipulations of our art. It is a morbid imagination, which exists in the minds of some, that, like a Titian, an Angelo, or a Raphael, looks to high art alone for success, without any regard to their business being systematized or a business training.

The photographic art has not yet reached that standard in the minds of the people. The public never did, and never will, become a judge of our work; not in any greater degree than we, as photographers, correctly judge of the real merits of artisans' productions generally. The more ignorant a person is of art, the more positive we find the declarations of knowledge. A person to be a judge of our art must necessarily be a producer of the same, and must understand practically the existing relations which one element or part bears to another, whether artistic, chemical, or philosophical. It is said by some that our patrons are growing more intelligent in the study of photography, and by their demands we have made onward progress. This is settled by the fact that a good production is just as liable to be rejected as a poor one, and ofttimes more so; the people never have been in any degree an incentive to our artistic progress and improvement; not a whit more than we have pushed forward the wonderful workings of the silk looms of France, or any of the great industries. We can make our art (individually working) one of elevation, popularity, and prominence, and make it grow in the admiration of the world. The first thing to do is to cultivate fine business qualifications. A good business man will make money; he won't fail: he can't "bust up," and if he is a student in the grand study of human nature, he will find out that, as things go at the present day, the more money he has, the greater his position socially and of influence, and in greater ratio is his profession honoured and respected. It becomes elevated and dignified in the same degree as we, its professors, become more perfect in the true principles of business, in integrity of character, honour, and credit. When we go into an elegant dry goods store, or any other repository of the industries where the proprietors have become wealthy from the sale of their respective wares by their thorough business tact, we are made incentive to a feeling of high order, of admiration, and look upon the goods we buy as far superior to those which come from a bankrupt, one-horse concern, though they be one and the same thing in quality. The public views us in the same light. Therefore, we may always expect that the producer will be best able to judge his own work. There is one thing we should be a better judge of, and that is human nature; we want to study this more; we must not rest our chance for future success too much upon assumed dignity as artists. There is nothing like being polite, gentlemanly, accommodating, and approachable to our patrons. Let us say, right here, there are too many who give evidence of foolish neglect and indifference in this respect, and it is a wonder that they succeed at all. That artist makes the most money who makes the best impression upon the mind of his patron. There is such a thing as preparing one's mind to reject with disgust or receive with satisfaction our work, whether it is good or poor. If we learn to be more genial and magnetic in our natures, we shall find our patrons will be less isolated. Reform in the right direction is needed by us all. What we need, also, is to exercise more freedom and frankness in the matter of "photographic rights." However, we must take exception to one thing: that the prices of our pictures have anything to do with the elevation of the art. We think the character and financial standing of the photographer has more to do with it. We have many times overstepped important little things in the art by our artistic anxiety in taking such long strides after something large and peculiarly grand; but we must remember that small things, while they are the most important, are most neglected. Drop by drop will soon fill the bucket, and it is by saving the small items, and watching with care small and generally unnoticed things, that determine our success. Does it pay to retain even one careless employee? And is it not necessary for us, as proprietors, to be on our guard in this respect? Then, again, if we would save, we must look out for the fractions: these have always been overlooked in this art. Would we save? Then at once do away with proof making; it makes menial, degraded slaves of us, lower than those of former days. We bow in humble submission to the most ignorant whims and fancies of detestable conceit. Let us take a stand together, and raise our heads again and breathe the air of freedom. And, to sum up some of the fractions: here and there are broken glass, broken negatives, silver and gold running down the sewers, silver wasted in pouring from one dish or bottle to another and in taking negative plates from the bath, collodion spilled from plates, excess of developer used, carrying all the silver from the negative, then using silver wastefully to intensify what they haven't got: a good deal like trying to cultivate brains where there are none. Handling greasy heads and then taking hold of the bath dipper and negative plate, and this skimming the grease off from the bath, spilling varnish from negatives, throwing negative plates, and especially ferrotype plates, into an obscure corner of the sink, or garret, or water closet, to avoid cleaning them; throwing out half the prints while printing for want of care, some too dark, some too light; a great excess of gold for toning, in order to get through the day's work earlier; and a general ruinous waste in many other instances by employees.

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[*] *Philadelphia Photographer.*

[*] *St. Louis Practical Photographer.*

Fortunes have been expended buying processes, formulas, worthless accessories and traps, and when they find their last resting-place in the rubbish garret, we begin to consider the interest on the money so foolishly expended. Many employees are not interested in their work; they "tramp" from one place to another, and when they get work, it is more automatic than human, they work like machines; the same routine every day, regardless of conditions, and then they stop work like machines, by the clock, bell, or some signal; the straps and buttons are all unloosened in their working-rig ready to go on or off at the minute, with about the same precision of the camel-desert scene in a circus, or the lighting of gas by electricity. Unless deeper interest is manifested by employees, they are not fitted even to assume the position of proprietors, and many proprietors at the present day are reaping the reward of remaining so long in that detestable old rut of carelessness, indolence, and indifference to the study of art and business rules We are creatures of habit, and through this involuntary force we are either going up or down the river of success. Which shall it be? A little extra zeal and exertion will easily determine. Employees, wake up! Feel that same anxiety and interest throughout the week that you do on Saturday night; then you'll begin to know how proprietors feel these dull times. Wake up, proprietors! we all need reform in many things; cultivate business principles founded on truth, honesty, and character; respect yourselves, and your profession *will* be respected and "elevated!" Harbour no employee who is uninterested. Bring all of your formulæ down to the essence of pure simplicity. Wake up! Like Rip Van Winkle, inaugurate new energies, make new resolves, study that *jewel* of art-education, which glimmered in its infancy through the fog of adverse circumstances.

Moral.—"Whatsoever a man soweth, that shall he also reap."

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THE NECESSITY OF A NEW DEPARTURE—CARBON PRINTING.

BY CHARLES WALDACK.[*]

The fact cannot be denied that a photographer, in delivering silver prints, cannot in conscience guarantee their permanency. It has always been the prevailing opinion, and it is so now with a large number of practitioners, that this tendency to fade is owing only to imperfect removal of the hyposulphite. This certainly is the cause in some instances, but it cannot be in large establishments, where the prints are submitted for hours to consecutive washing and draining. The truth is, that even when all the hyposulphite has been removed, the photograph will not stand, and that the tendency to fading is owing to the peculiar composition of the organic compound forming the image, which is capable of undergoing what may, perhaps, be an oxidation, and is still sensitive to light, however strong may have been the action of the hyposulphite. Such a state of affairs must certainly bring photographers and their business into discredit, and the necessity of adopting a different mode of producing the positive image is obvious to any candid mind. The question now is, whether the carbon process is to be adopted, and whether it possesses sufficient advantages to be considered as the process of the future? The claims made in its favour are permanency, results equal or superior to those of silver printing, and facility of production.

Permanency.—To enable those not well posted in the matter to judge for themselves, it will, perhaps, be well to give an idea of the reaction taking place in carbon printing. A sheet of paper has been covered with a layer of gelatine to which pigments or colours have been added to obtain any desired tint. This is immersed in a solution of bichromate of potash, and dried in the dark. It is then exposed to light under a negative, and is afterwards immersed in warm water. Now, wherever the light has acted, the gelatine has become insoluble, and will retain the colour mixed with it, while the gelatine which has not been acted upon will dissolve. The image thus obtained is hardened in an alum bath, and thus transformed to a substance similar to leather. If the colours used are staple, a permanent photograph will be the result. In order to imitate the tone of a silver print, however, pigments have been used in the manufacture of tissue which are not permanent, and as these pigments enter in the proportion of two to one of lamp-black, which is truly permanent, the so-called carbon photographs, although not fading in the same manner as silver prints, will, when exposed to strong light, undergo a marked alteration. The change observed can be used as an argument not against the process of carbon printing, but against the quality of certain tissues. That tissues can be made, and are made, that will yield unchangeable prints, there is not the least doubt. The madder pigments, and the red oxide of iron added in suitable proportions to lamp-black or India ink, yield colours imitating those of silver prints, which are as little subjected to alterations as the red and purple of the silk and cotton prints. There is no reason, either, why we should stick to the ordinary photographic colours, and I will venture to say that in a few years from now warm blacks and sepias will be preferred to brown or purples.

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[*] *St. Louis Practical Photographer.*

Superiority or Inferiority of Results.—Experimenters in the carbon process, using the thin negatives suitable for printing on the heavy gloss albumen paper, will generally obtain results which, although they may be pleasing, are inferior in vigour to silver prints made from the same negatives. This defect is owing to various causes. Some tissues yield stronger prints than others. A weak bichromate solution and a short immersion produce vigour. So do rapid drying and immediate use. Slight over-exposure, followed by development in water the temperature of which is gradually raised, will also produce vigour. In all cases where any difficulty is experienced, it would not be very troublesome to make negatives slightly more intense. We have got into the habit of making thinner negatives to suit the heavy albumenized paper now generally in use, in order to produce prints which no conscientious photographer would dare to guarantee for a year. Why should we not make a slight alteration in our mode of working to produce more bold and vigorous prints in carbon?

Facility of Production.—With a few opal plates, two or three zinc dishes, and a tea-kettle of hot water, it is certainly not possible to do a great deal of work in a day. To the experimental, carbon printing seems thus a long and troublesome process. In well appointed workrooms, such as those of Geruzet Brothers, in Brussels, Beernaut Brothers, in Ghent; Higginson, in Southport; Sarony, in Scarborough; and others, a larger number of prints are produced in one day by experienced hands than are usually made on albumen paper. The requirements are a quantity of opal glass, an abundance of hot and cold filtered water, and a number of wooden trays lined with lead or copper. The operations have been simplified also since Mr. Lambert's visit to this country, and one, the collodionizing, is generally omitted.

The only point in which silver printing has the advantage is in the cost. A sheet of albumen paper, silvered, toned, and fixed, costs 16 cents; some have put the cost down to 13 cents. The surface of such a sheet is 2¾ square feet. A roll of tissue of 30 square feet costs $3·50, which is about 12 cents a foot. A roll of double transfer costs $1·50, which is 5 cents a foot. We will count bichromate and waxing solution at 1 cent, which will bring the cost of a print one foot square at 18 cents. A print the size of a sheet of albumen paper would thus cost 49 or 50 cents, which is three times the cost of the silver print sheet of same size. There is no reason, however, why such prices should be kept up. Tissue and transfer paper can be sold at half the present cost, leaving a handsome profit to both manufacturer and dealer, and it is to be hoped that the reign of monopoly will soon be at an end. The Swan patent, which protects the manufacture of tissue, expires at the end of February, in England, where it originated, and, according to Section 4,887 of the revised statues of the United States, expires here at the same time. This paper would, in my mind, be incomplete if I did not throw a little light on this question of patents. The Swan patent, which, as stated above, expires at the end of this month, protects also the transferring of a piece of insolated tissue to another surface to which it adheres, so that, if immersed in warm water, the paper to which the mixed gelatine has been applied can be removed, and the picture developed from the back. This being the case, any one can, after the date above named, practise the single transfer process without infringement. The single transfer consists in applying the wet tissue to a piece of wet single transfer paper, and developing.

The Johnson patent protects the use of solid bodies as provisional supports. What Mr. Johnson means by solid bodies is not exactly clear. Liquid or gaseous bodies cannot be used. The probability is that he means rigid bodies, such as glass, zinc, or porcelain, and not flexible bodies such as paper. If this be the case, Mr. Sawyer, of the London Autotype Co., has furnished us the means of doing without Mr. Johnson's licence, for he invented and patented in England, Sawyer's flexible support, which is nothing else but single transfer paper to which a coating of wax or wax and rosin has been applied. Whether Mr. Sawyer has or has not a patent in the United States, I cannot state. If he has, it is not included in the patents sold by Lambert. Mr. Lambert's chromotype patent is simply for the use of a mixture in which permanganate of potash is the active agent, as a strengthener for the carbon print. Mr. Lambert certainly deserves great credit for his ingenious adaptations of the inventions of others. Before he came to England and to America, carbon printing was practised by but very few, and to him we owe the impulse which it has received. There is nothing in his mode of working, however, which is not covered by the Swan and Johnson's patents.

I have stated above, that the vigour of the carbon prints depend to a great extent on the preparation of the tissue. Tissue can be made, and will soon be in the market, which, with an ordinary negative, gives a very flat print. Such tissue is specially adapted to enlarging by means of the solar camera. It is so sensitive that an enlarged print can be made with it from a contact negative in an exceedingly short time, and with all the details and modelling which it would be impossible to bring out by direct printing on silvered paper. The advantage of this will be appreciated by photographers and artists, and it is to be hoped that the time will soon have passed when the skill of an artist is applied to photographs which are certain to fade within a short time.

Correspondence.

COPYING.

Dear Sir,—In last week's issue of the Photographic News there is an excellently-written paper on copying by Mr. F. M. Spencer, but there is one part that I must say I do not agree with, namely, that copying is the least fascinating of all. Certainly I will quite agree that it is very irksome. What I mean to say is, that we can reproduce a better copy than the original, especially in crayon drawings, and in a vast number of photographs, and nobody denies but that it is fascinating then. Another thing that was omitted was the copying of oil paintings, which are best copied in diffused light. Meaning no offence, in writing these few lines, against Mr. Spencer's excellent paper, I remain, yours truly, A. Clarke, Jun.

Bangor, April 30th.

PS.—There is likewise a very useful and interesting paper written by Mr. Webster on the "Production of Reversed Negatives." I propose, instead of the four bits of paper he places to prevent the sensitized plate from getting scratched with the back of the frame, that we should have different sized glasses, with a bit of glass or other material cemented at each corner, as the paper might slip when you went to remove the plate, and might be the cause of spoiling the negative.

ART CLUB FOR PHOTOGRAPHERS.

Dear Sir,—There exists among amateur water colour painters a club, the working of which is as follows:—The Secretary gives a list of twelve subjects at the commencement of the year as representative subjects for painting, one to be sent to him by each member each month. The whole are then forwarded from one member to another, for examination and criticisms, which are freely written on the back of each picture, so that it may be seen by all in turn, and when the whole are gone the round they are returned to their separate owners. The subscription is only two shillings the year and the cost of posting from one member to another.

Might not this same working be applied very successfully to photography, both landscape and portrait? If you will kindly ventilate it, I feel sure it would be taken up, and am, dear sir, yours truly, A Would-be Member.

Proceedings of Societies.

Liverpool Amateur Photographic Association.

The usual monthly meeting of this Association was held on Thursday evening, the 25th ult., at the Free Public Library, William Brown Street, Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and passed.

A letter from the Hon. Sec., Mr. W. Murray, was read, announcing that the presentation print for 1877, the "Arch of Constantine," from a negative by O. R. Green, was now in the hands of the Autotype Company.

Mr. Moore sent some fine American cabinet and carte pictures for exhibition.

The Rev. H. J. Palmer passed round gelatine negatives by his favourite process on glass and on films, also two groups on Bennett's instantaneous plates, with which he was much pleased.

Mr. Weber had some fine lantern slides from negatives by the gelatine process.

The President exhibited a number of 7¼ by 4½ negatives on washed emulsion plates.

It was proposed by Mr. J. H. T. Ellerbeck, and seconded by Mr. W. H. Wilson, that the question of this year's presentation print should stand over until after the midsummer recess, and that members be invited to prepare negatives for competition for this purpose.

It was also decided to have an excursion to Speke Hall, May 11th or 18th, if the requisite permission could be obtained.

The meeting afterwards adjourned until the 30th inst.

Talk in the Studio.

Obituary.—We announce with much regret the death, on the 20th, after a painful illness, of Mr. J. A. Spencer, with whose name all photographers are familiar as having been very many years associated in various ways with their art. He was principally known for many years as a manufacturer of albumenized paper of great excellence; but of late years, seeing with far-reaching vision that carbon must supersede silver, he devoted his attention to the manufacture of tissue, and became associated with the Autotype Company, from which he recently retired. His death is a loss to carbon printing, as his interest in the subject and his experience in making tissue were of public value. Mr. Spencer was highly esteemed for many fine personal qualities, and dies much regretted by all who knew him.

Photography in Ceylon.—We have been favoured by Mr. W. T. Wilkinson, recently of London, with some exceedingly fine photographs of sunset scenes, including fine clouds and seas taken at Ceylon. The tropical conditions do not appear to interfere with successful photography, for the prints are exceedingly fine. Mr. Wilkinson speaks highly of the gelatine emulsion sent to him by Messrs. Wratten and Wainwright, and hopes shortly to send us examples of its working.

To Correspondents.

H. Penn.—The albatype plates are prepared in America, where, we believe, they are the subject of a patent. They resemble a ferrotype plate with a white enamelled surface.

Black.—An ordinary background painted a dead black, or covered with black cotton velvet, will answer; but it is important to place either a good distance behind the sitter, to secure perfect blackness.

Pepper.—If "Pepper" had read our recent article on the subject of "Answers to Correspondents," he would have known that we cannot, under any circumstances, undertake to examine samples of chemicals, as it would involve the devotion of time and labour much more than we can spare. If the bromide, which should not have been used, will not dissolve, let it deposit, and then decant the clear collodion off. Iodize with equal parts of iodide of cadmium and iodide of ammonium, each two grains to an ounce of collodion, and one grain of bromide of cadmium. 2. Bees'-wax is not soluble in alcohol, except in very small proportions. The addition of ether will make more dissolve. But the proper solvents are essential oils, turpentine, and benzole.

S. P. Q. R.—Beyond a question No. 4 is much inferior to No. 8. It is simply an imitation by an inferior hand. 2. It is probable the surface of the mounts is slightly greasy from some cause. Try sponging them with a dilute solution of ammonia, and allow to dry, and then mount.

J. W. Sykes.—So far as we can judge of your descriptions, the silver solution may be used for printing with safety. Nitrate of silver should never be kept on paper, as it will soon get contaminated with organic matter; to such contamination your deposit is due, and this has doubtless left the solution pure. Your second trouble is more difficult to overcome. When acetic acid is mixed with a silver solution, it is very difficult to remove, and its presence is injurious in the ordinary silver bath for negatives. We should be disposed to add the solution to the printing bath, where the acetic acid will not be injurious.

Ignor. Amat.—No 1 is one of the best lenses of all work that we know, and will answer very well for portraiture in the open air, as well as for landscape work, copying, architecture, &c.

Quercus.—There are two firms who undertake such work: the Autotype Company, Rathbone Place, and the Woodburytype Company, Great Portland Street. 2. The Woodbury process, and Lichtdruck. 3. These two methods are the only successful modes of producing photographic half-tone by mechanical printing.

Herberta.—We do not know the address of "Amateur." Many correspondents ask questions without giving their addresses or names.

C. J. Farlie.—A "moist lad" is a very undesirable hand in the printing room; but the stain on the paper enclosed is not due simply to moist hands, but to having touched hypo with those hands, and then touched the silvered paper. It is of the greatest importance that any one handling or even touching hypo should wash the hands thoroughly before doing anything else in photography.

John J. Glover.—The addresses of the gentlemen you mention are given in the published list of the members of the Photographic Society, from which we copy them: Frank M Good, Hartley Wintney, Winchfield, Hants; F. Bedford, 326, Camden Road, London, N.W.; W. England, 7, St. James's Square, Notting Hill, London, W.; A. H. Bool, 86, Warwick Street, Pimlico, S.W.; V. Heath, 43, Piccadilly, London, S.W.

A. F. P.—We cannot decide the cause of the spots with absolute certainty, unless we superintended all the operations personally; but it seems to us that the cause is imperfect fixation, caused by minute air-bells forming on the print whilst in the hypo, and so preventing the fixing solution from acting fully at the point where each air-bell is formed. Examine each print carefully after its first immersion in the fixing bath, and if air-bubbles are formed remove them with a clean camel's hair pencil or a glass rod.

W. Monckhoven.—Many thanks. We will procure the number in question.

A. M.—With your ridge 12 feet high, you had better make your eaves, both on the north side and south side, 7 feet high, and let that portion on the south side be without glass, as the wall would obstruct all light; on the north make 5 feet at each end roof and sides opaque, the remainder glass down to within 2 feet of the ground. Both ends opaque, of course. About 8 feet of south roof glass, which will, however, be generally covered with blinds, but will be useful to uncover in dull weather; all the remaining portion of the south opaque.

John Allan.—There are two ways of getting rid of air-bubbles in enamelling prints: one consists in beginning to lay down the print at one end, driving a small wave of water before it to bring the remaining portion down; the other plan depends on the careful use of the squeegee, driving out all bubbles by its scraping pressure.

Several correspondents in our next.

PHOTOGRAPHS REGISTERED.

Adams and Stilliard, Southampton,
Four photographs of Rev. Canon Beadon.
Photograph of Mr. E. Hine.
Mr. G. Harrison, Redland, Bristol,
Photograph of the "Black Boy" Inn, Redland.
Mr. Louis Bertin, Brighton,
Photographs of Countess of Dudley.

The Photographic News, May 10, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Photography and the Drama—Photography and Exhibitions of Paintings.

Photography and the Drama.—In a new comedy, "Retiring," from the pen of a new author, Mr. Williamson, produced at the Globe theatre last week, a good bit of fun is made out of the custom of photographing prisoners and suspected persons by the goal authorities. Mr. Lionel Brough, the well-known comedian, takes the part of the individual operated upon, and he comes back furious at the indignity put upon him. He represents a hard-working livery stable keeper, who has just been enabled to retire, when misfortune overtakes him in the form of a suspicion that he has committed a jewel robbery. His wife, an honest body enough, scarcely sees the matter in its serious aspect, and only gives way when she thinks that her husband can never do his regular amount of oakum picking in the day. Ultimately he is liberated on bail, and comes back into the bosom of his family to tell of his experience. The worst trial of all, he maintained, was being photographed. But the wife fails to see any hardship in the matter; on the contrary, she is pleased. "I always said you would never allow your photograph to be taken till you was obliged. Have you got it with you? Is it a good one, now?" She wants to place it in her album, but is assured that the governor won't part with it, since he has a family album of his own, in which he has a very complete collection already. Another piece that is now being played with much success on the London boards has also a photographic album that is made much of, our readers may remember. In "Pink Dominoes," in the first and last acts, the looking over a collection of portraits by an old gentleman forms a principal feature of the play. The "Pets of the Ballet," and other ladies, who form the subjects of the collection, are continually absorbing the attention of the aforesaid admirer, who, double eyeglass in hand, and nose almost touching the pictures, smilingly remarks, "Pretty creatures!" every time he turns a page. His staid and spectacled wife, naturally angered at such conduct, continually calls him to account, but he turns away only to resume the all-absorbing occupation at the first opportunity. Strange to say, however, photography is rarely employed in plays and novels in a way in which it appears particularly suitable for the development of a plot, namely, to furnish proof by a likeness. One would have thought that photography, being such good evidence, would be eagerly embraced by playwrights as a means for bringing about a telling *denouement* when the guilty are to be punished, and the virtuous rewarded. A locket worn round the neck, or a ring that is remembered as a keepsake, is nothing compared to the discovery of a photograph proving the identity of hero or villain, as the case may be. In Dion Boucicault's play of the "Octoroon" an attempt of this kind is made, it is true, but the absurdity of the particular example where an *undeveloped* image is not injured by daylight has possibly frightened off other authors.

Photographs and Exhibitions of Paintings.—The opening of the Paris Exhibition, of the Grosvenor Gallery, and the Royal Academy, all in one week, opens a vast study of art to those fortunate enough to be able to benefit by the same. As in former Exhibitions, the picture and art galleries will form an interesting feature of the Paris Exhibition, although it is not to interfere, we are told, with the regular holding of the *Salon* which always open in May at the Palais de l'Industrie, in the Champs Elysees, contemporaneously with the Royal Academy in Piccadilly. Thanks to the growing custom in this country to do as they have done on the Continent for some time past, we may expect to see photographs of all the greater works of arts exhibited this year both in Paris and in London. A few years ago there was scarcely an exhibitor of the Royal Academy who would not have grumbled loudly, to put it mildy at a photographic copy being made of his picture; now since the issue of a volume of pictures of the leading sights within the building, an artist of note would be considerably exercised in his mind to find himself unrepresented in the photographic album. Painters have been a long time getting to understand this, but that the day would come when they would deem it a benefit, instead of a disadvantage, to have their works vulgarised by photography, has been evident for some time. The paintings that are engraved from year to year are few and far between, and it is only those which can possibly suffer by the photographer forestalling the graver. In the greater number of cases an artist's work, after its exhibition at the Academy, is never seen again except by the proprietor and his friends, and is forgotten by the general public. But if well photographed, the picture, if it is a good one, is sure to be widely spread, and the painter obtains more *kudos* in this way than he does from the original. We do not see, in fact, why the artist should not obtain much more than honour and glory. It is a very cheap and easy affair to copy a painting by photography—we mean in comparison to engraving it—and copies of good size could be produced, suitably mounted, and printed in permanent pigments, for a few shillings. In fact, if prints of this kind were to be sold for five or ten shillings, of a size suitable for framing, there cannot be a doubt of the large number of buyers, and, seeing that half the amount may be regarded as the profit, the artist should benefit considerably by such a transaction. Of course, the trade would have to be initiated in the first instance, and thoroughly well carried out, but there need be no difficulty in the matter, providing the authorities at Burlington House were to support it. Indeed, there is no reason why a photographic staff should not be attached to the Royal Academy for the purpose, so as to be entirely under the control of the officers of that body. We all know what charming photographs come to us from France and Germany, where for years past paintings have been copied by the camera, and photography thus made to increase the profits of the artist. Indeed, in France now-a-days, some of the best men make the painting of pictures especially suited for copying by photography one of their principal occupations, and seek their recompence solely, or almost entirely, from this source. We, however, have long acted upon the other plan, and painters have jealously forbidden the copying of their work in this way. Two disadvantages to them were the result: in the first place, they did not receive money they might have received; and secondly, unscrupulous people took to pirating their pictures. They are now growing wiser, however, and in a few years' time we may expect to see copies of works from the Royal Academy and the Grosvenor on sale in the printsellers' shops about London. There is no reason, as we have before remarked, when discussing this subject, why people with moderate purses should not in time possess picture galleries like their betters. How many of us would like to spend a sovereign or two every year in the purchase of a couple of gems from the Academy, and thus make a collection of the various years, until a goodly series is contained in the library or dining room! Peoples' taste is so varied, that were it possible to purchase them, no doubt a hundred or so of the more attractive pictures would be in demand by the numerous visitors to the Academy. As we have said, the artist would benefit considerably by such transactions. Not only would his name be familiar to hundreds—and, perhaps, even thousands— of purchasers of a copy of his picture, but if a royalty of a few shillings came to him for every picture sold, the sum realized would be well worth his having. Unfortunately, the guiding spirits of our artists are decidedly conservative, and share an inveterate dislike for anything photographic; and it is questionable whether we should have advanced as far as we have done already if French and German painters had not set us the example. That in the end photography will become the great copyist and populariser is, however, certain, and in time will replace engraving in a very great measure, as it has done several of the graphic arts already. It resolves itself into a mere question of time.

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PROOFS.

BY NORMAN MAY.

The subject of proofs is a very vexed one, and one on which exists great diversity of opinion. A great many photographers are discussing the advisability and necessity of giving any proofs at all, and are beginning to ask themselves "whether it pays," and are taking into consideration the greater amount of time and trouble that is spent in first getting up proofs, and then, after a lapse of a few days, having to print the order, instead, as under the old method, of taking one or two positions, but generally one, and printing the order from either or both, giving the sitter no option or chance of resitting. Certainly that was a very paying system, and one that, at the time, gave satisfaction to the majority of sitters. Proofs were never given, and rarely asked for. The money was paid, the whole order was sent home, and there was an end to the transaction. No proofs, and few resittings.

But could it be done now? No! Times have changed, and in a good class business proofs are not only the fashion—or, rather, the custom—but necessities. I think few people now who pay a tolerable price would be satisfied to have their order completed without first seeing whether the proof was up to their requirements. The taste and art education of the public—or, at least, their appreciation of a good photograph—have advanced, and they expect and require a better article than that they once thought perfection. A likeness is not all they want; some semblance of what they consider a picture is needed, and, lacking in some to them essential point, a whole dozen of photographs will be condemned and rejected.

To prevent this growing evil, the practice of giving proofs was adopted, an evil, some think, of greater magnitude than the one it designed to combat; but I believe all thinking photographers will agree that it is only fair to the sitters, and pays better to meet their reasonable wishes, by submitting at least one proof.

There is a great difference of opinion as to whether the negatives should, or should not, be retouched before proofs are printed. I know at least one excellent photographer who sends out untouched and untoned prints. Such a plan has its advantages, the chief of them being the great save of time that would otherwise be spent in retouching negatives that very probably would not be ordered from, and the sitter is able to see them the next day. The prints soon fade, and stop the criticisms, either favourable or otherwise, but still last long enough to serve the purpose for which they are intended; but to counterbalance anything that might be said in favour of this certainly inexpensive plan, is the fact that a negative which would give a print harsh in expression if printed untouched, can be totally altered by the pencil; if it cannot change completely from grave to gay, it can at least fill the deep lines and smooth the wrinkled brow, softening the severe frown to an expression of placid calmness. When printed lightly, untouched proofs do not, of course, show imperfections that would appear in a darker impression, but they also fail to show those beautiful details, especially in white or light drapery, which go so far to make the photograph a picture.

How many an old lady, more particularly an old maid, has returned her proofs as unsatisfactory because the hair was too white (owing to an excess of top light), a thing easily to be remedied in the toned and mounted print, but which argument alone will fail to convince her of. Toning down the false reflected light in the eyes, removing the often objectionable mole, taking a slice from the too fat cheek, and many other things that suggest themselves to the photographer, can be done in the mounted print to make a picture pleasing that would otherwise be rejected. So it seems to me better to retouch, mount, and completely finish all proofs, as customers can then see exactly what they are going to have, while they would judge but imperfectly from the unfinished print, and generally either under or over-estimate its good qualities.

Photographers greatly differ respecting the number of positions that should be given as proofs. Some take an almost unlimited quantity of negatives, and print proofs from all those they think are good, irrespective of any rule regulated by the number of copies ordered, or likely to be ordered. That does not seem to be the best plan possible, as some sitters who only receive one proof will consider themselves slighted when a more highly favoured friend has three or four sent, both wanting the same number of copies.

One photographer of my acquaintance gives one position when half-a-dozen copies are ordered, and three proofs for one dozen copies. That doesn't seem quite right; it certainly holds out a greater inducement to have a dozen, but an inducement is already in existence by charging a greatly reduced price for the second half dozen, and in these days of retouching an extra proof means often as much as the whole profit on the transaction would be likely to be. Another, when Rembrandt pictures are required, takes two negatives that can be either printed as cabinets or cartes, and proofs are sent of each in each size, making four in all. This plan is open to very grave objections indeed. Firstly, all sitters do not want cabinets, and truly say that they do not see why they should be obliged to keep and pay for an article they do not require. Secondly, it is a very difficult thing to take a negative whose pose shall suit satisfactorily both carte and cabinet. If intended for a bust only, the head will be a little too large for a carte, or will show the hands, almost always hugely disproportionate, in a cabinet.

If the figure is posed gracefully for a cabinet, one shoulder will perhaps look much higher than the other if printed as a carte, or the hand will be up to the face, and appear unsupported, reaching from a vague distance, and not belonging to the picture; or the waist will be cut off at a critical part, giving the bust the appearance of being balanced on a pivot, peg-top fashion.

These are great objections, urged, I know, by the customers themselves. People often order both cartes and cabinets from the same negative, but oftener not, and the additional outlay and loss are not compensated for by the amount of such orders. When the number of copies from a cabinet negative that has been taken to order is completed, it may pay to send a proof printed as carte, providing the negative is suitable, but not before the cabinet order is finished, or they may order cartes in preference: but it doesn't pay to send and charge for cabinet proofs when only cartes are required. People look at it in the light of a kind of mild swindle.

Another photographer, who commands good prices, takes four positions when a dozen copies are ordered, but only retouches and submits two of them to the sitter. By this means he has a great choice, and keeps up the standard of his work, which is really excellent; but does it pay? Would it not be better to make quite sure that the pose and expression are as good as can be obtained before exposure, and take only two good negatives, proofs of both being printed. This photographer does it more out of pure love for his art than thinking of the financial results, but with most men it's a question of £ s. d., and "Would it pay?" is the first thing asked.

When taking four cartes on a plate, two of each position, people often ask if all four will be printed from, and are sometimes a little annoyed when told that the best of each pose will be chosen by the photographer and submitted for their approval; they seem to think that all should be printed and sent, as they would be the best judges of which would be the most like them, totally ignoring the cost of extra time and material. Of course this is utterly unreasonable, but they cannot always see that. Last summer I had to take two plates, with four carte negatives on each, of a child and dog. There were only half-a-dozen prints wanted, but the lady was quite offended because I would not send her proofs of the whole eight. She wasn't satisfied with seeing one, though it was the only good one. Luckily, the order was prepaid, or she probably would have refused to have had any. She said a photographer on the south coast always sent her about six proofs, even though she only wanted half-a-dozen altogether. I dare say she spoke the truth, and if so I feel sorry for that photographer; he has much to answer for. 'Twas a most absurd request, as to finish both negatives, and print all the failures as proofs, would cost more than she paid for the half dozen. She couldn't see it in that light, though.

I have seen and been intimately acquainted with many systems of proof giving, and I think of them all the following answers the best—one proof, and one proof only, is sent for each half dozen copies ordered. Thus: a customer ordering a dozen would have two positions taken, and two proofs submitted; if two dozen be required, four proofs are sent, and so on, one position for each six cartes. This rule is put plainly and prominently on the price list, so there is rarely a dispute, or dissatisfaction expressed.

The subject of re-sittings is almost inseparable from that of proofs, as by sending pictures for approval we imply a willingness to give another sitting if necessary—at least, when only one is sent. It is well to have a fixed rule. Instead of giving free re-sittings, would it not meet the requirements of the case if extra proofs were charged at a reduced rate, say two-thirds the price of the first sitting. Who does not remember the case of the American photographer suing a lady who, though she had had photographs produced from seventeen sittings, was, even then, not satisfied?

If a charge is made amply sufficient to cover the cost of production, it would be more likely to suit both customers, who do not feel then they are giving unnecessary and unusual trouble; and the photographer, who takes his re-sitting with a will, as he knows he is paid for his labour.

Some photographers, instead of sending proofs, are in the habit of showing the negatives, and letting the sitters choose from them which they think they would like; but such a plan never answers satisfactorily, as people almost invariably pick out the worst one, especially if it's under-exposed, and looks "clear," as they call it; besides, the expression and many things can be altered in the retouching and printing.

So the plan that I think would be found to answer generally would be to always give a certain number of proofs proportionate to the number of copies ordered, and to take re-sittings (unless the picture is photographically bad) at a rate not exceeding two-thirds of the value of the first proof.

REPRODUCTION AND ENLARGEMENT OF NEGATIVES BY THE COLLODIO-EMULSION PROCESS.

BY WILLIAM BROOKS.*

Reproduction of Negatives.—Photographers, at times, are at their wits' end to know how to get off prints in large numbers from a single negative, and failing to do so a great deal of business is entirely lost. Sometimes it may be a portrait of some celebrated person, at other times a landscape; and we all know in dull weather, if a publishing order is given by one of the wholesale houses, unless we have some means of reproducing the negative it is quite impossible to execute a large order when pressed for time. I have seen many attempts made, and have made many myself, with the bath process, but I have never seen a result produced that would compare with a proof print from the original negative.

Some few months since a well-known firm had an order to execute, and I was asked if I could reproduce some negatives so as to get the number of prints completed by a given time. I set to work and reproduced several, which gave great satisfaction, and thereby the firm were enabled to execute their order. I now submit for your inspection a proof from the original negative, and also a proof from the reproduced one. The method I adopt is by no means a difficult one, which I here give in detail.

The first thing to do is to produce a transparency as perfect as possible. I always find it best to use patent plate, and after this is well cleaned it is edged with india-rubber solution for about one-eighth of an inch all round; it is then coated with washed emulsion and allowed to dry. I use an ordinary oak printing-frame with a thick plate-glass bed plate, similar to that I have here. I then get a piece of six-sheet card or mounting-board large enough to fit in the printing-frame, and then lay the original negative down on it, marking round it with a mount cutting knife. After removing the negative I cut out the centre, which is the size of the negative; when that is removed the negative will fit in tightly. If this mask be not used the transparency will have a halo all round the edge for about a quarter of an inch, and sometimes half an inch, according to the subject. When the negative is in the mask I very carefully dust it with a stiff brush, a flat hog's-hair varnish brush being best. I then, with great care, bring the two edges of both the negative and the prepared plate together, and lower it down in contact. The utmost care must be taken not to allow the plate to grate, or the film of emulsion will be injured and cut. The putting in of the back of the printing-frame requires notice. In putting it in, always place the side in first nearest where the bars are hinged, thus always keeping it pressed as tight as possible in that direction; for, if it be not, when the bars are brought down the springs will give it (the back end) a sliding motion, and cut and injure the film. The bars having been fastened the frame is now turned over and exposed to light for a length of time depending on the density of the negative, also on the rapidity of the emulsion and quality of the light. The frame is then taken into the dark room, the back board carefully removed, still keeping it pressed towards where the bars are hinged, when the plate may be removed by a pneumatic holder. While attaching it, press on the plate with the thumb and forefinger of the left hand. In my own case I place my left hand on one edge of the plate, and lift the plate by one corner with the nail of the forefinger of my right hand, and by adhering to these rules I seldom damage or injure a plate in the slightest degree.

The development is effected by alkaline pyro. in the usual way, and the proper intensity must be obtained by the alkaline developer alone. The plate is then fixed with hypo. I find it best to add a drop or two of acid to the hypo., as this prevents the film from becoming baggy. The plate is next well washed; not only well washed, but allowed to soak in a tray containing plenty of clean water, as it seems almost impossible to wash out the last traces of hypo. from the film, owing to its being so porous. If not washed properly, after a few days the transparency becomes stained all over in patches, which ruin it completely. About half-an-hour is sufficient time to allow it to soak; it is then well washed under the tap, and set up on end to dry spontaneously, and varnished with a pale-coloured, thin spirit varnish.

Having produced the transparency possessing the requisite density—namely, the shadows deep and the high lights transparent, with the intermediate gradations—the next step is to produce the negative. The negative is replaced in the frame by the transparency, and another plate placed in contact with it in a similar manner as before when making the transparency, and is developed with alkaline pyro. The intensity must in this instance be also brought up with the alkaline pyro. to avoid any texture, and with ordinary care results can be produced that will satisfy the most fastidious.

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* Read before the South London Photographic Society.

Enlargement of Negatives.—The transparency is produced in the same way as already described, only care must be taken not to have the shadows too intense. It is better to make the transparency on a plate somewhat larger than the original negative, for if the plate be the same size the edges of the holder which holds the transparency reflects light, and the edge of the enlarged negative is imperfectly rendered. I use an ordinary room, the window of which is fitted with a shutter in two halves. The bottom half carries the camera, which is fitted to it with focussing arrangement; and about two inches on the further side of the transparency I have a piece of ground glass to diffuse the light. In the upper part of the shutter I have a sliding sash glazed with non-actinic glass, and over that an opaque sliding shutter. In front of the camera I have an upright easel on castors, and on the floor at right angles with the camera I have a piece of wood, about 3 by 2 inches, screwed; and by keeping the side of the foot of the easel close up to it I am always sure of having my subject square. I focus a piece of glass covered with white paper, the lens open when focussing, and then stopped down. I only require in my practice to work up to 24 by 18. I do not find the slightest difficulty in coating the plate with emulsion, providing I pour plenty of it on in the first instance; the plate neither requires an edging or substratum of any kind. I always use a washed emulsion, and there is not the slightest fear of the film slipping, for it sticks like wax. When the plate is coated and set, the same as with ordinary collodion, I put it to soak in water (common water), making use for this purpose of a wooden tray lined with sheet zinc, which answers admirably. It is allowed to soak for about ten minutes or quarter of an hour, or even longer; there is no fear of it spoiling. When the water runs freely over the surface it is taken out, slightly drained, and the exposure made. The plate will keep in good condition for an hour or two. I find about the same time as for wet collodion quite sufficient. When the plate has been exposed, and before applying the developer, it is flushed with water. I find it best to apply the alkali and bromide first. It is immaterial whether ammonia or washing soda is used. After it has been on the plate, and well worked about to ensure even action, a drop or two of a ninety-six-grain alcoholic solution of pyro. is added. If a thin, delicate negative be required, use very little pyro.; if an intense negative be necessary, use plenty of pyro. I have developed a 24 by 18 plate with only one grain of pyro. By regulating the quantity of pyro. any class of negative can be produced as desired.

I consider enlargements made by the collodio-emulsion far superior to those made by the bath process. I submit for your inspection some prints from negatives produced by this method, and you will find there is not the slightest texture. The foregoing remarks I have made are relative to the way in which I am in the habit of working; others may work in a different way, according to circumstances.

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THE SCIENTIFIC APPLICATIONS OF PHOTOGRAPHY.*

IN a recent article we briefly reviewed late progress in astronomical photography. In the present we propose to point out some of the latest and most curious applications of photography to scientific investigation, besides its special adaptations to many useful purposes, many of which have been recently explained by M. Radau.

With the magnificent panoramic views of sketches of landscape which it is now possible to produce by photography every one is familiar. Apart from the value of these as works of art, they have practical applications to topographical uses, to which reference will be made further on. A curious feature of photographic representations of archæological objects is that the careful study of the picture is often the means of revealing facts hitherto unnoticed. For example, on a photograph of the Acropolis, at Athens, Baron Gros discovered, by the aid of a lens, a curious carving on one of the stones which formed part of the ruin. The engraving represented a lion devouring a serpent, the design evidently dating from an ancient Egyptian epoch. Another odd circumstance is, that photography sometimes reveals things totally invisible to the eye. Inscriptions on ancient manuscripts have thus been brought to light. The ink, containing peroxide of iron, had faded so that it was no longer visible, but it had affected the photogenic power of the surface, so that in the photographic print the characters once more appeared in their original blackness.

Geodesy and military topography now find an important aid in photographic views. The picture, being produced by lenses, is made to conform to geometrical rules, and represents a central perspective much more exactly than could be produced by means of measuring instruments. A number of such photographs of a given locality, taken from different stations, allow of the determination of both the relative situation and the location of objects, and thus charts may be accurately constructed without the necessity of making actual surveys. It has been proposed in this way to map new regions, such as the interior of Africa, photographs being taken of large expanses of country from commanding eminences, thus avoiding a large amount of arduous personal labour. Military maps are not only now reproduced in large numbers by photography, but they are supplemented by numerous views of the district plotted, so that an army in strange territory is thus afforded minute information, not only of the general physical characteristics of the region, but of its minute peculiarities.

There is probably no more important application of photography to scientific uses than as an auxiliary to meteorological work. Photographic registering apparatus operating automatically produces curves, which show by simple inspection of the phenomena incident to climate. If, for example, it is necessary to register the indications of a barometer or thermometer, a clockwork movement unwinds in rear of rear of the instrument, which is suitably illuminated, a band of sensitized paper, on which the varying heights of the mercury are recorded.

Atmospheric pressure is registered in this way by the aid of an ordinary barometer, suspended so that the shadow of the mercury meniscus and the divisions of a scale traced on the tube are projected simultaneously on the sensitized leaf. To record the movements of a thermometer the beam of light is caused to pass, not through the vacant space above the mercury, but through a small air-bubble, introduced in the mercurial column, and which thus serves as an index. The addition of a wet bulb thermometer allows of the production of two thermometric curves, which separate as the air becomes drier, or approach when more moisture is present. The relative humidity of the atmosphere may also be registered by means of a hair hygrometer, the needle of which travels across the slit through which the beam of light passes.

In order to record the fluctuations of terrestrial magnetism, movable magnetized bars are used, each having attached to it a small mirror, which, when at rest, forms the prolongation of a fixed mirror. The beams of light which the two mirrors reflect through a slit describe on the sensitized paper a black spot, which becomes a line as the paper moves. The least oscillation of the bars causes the separation from this line of the trace produced by the movable mirror, and in this way all the movements of the magnetized bar are registered. It will easily be understood how arrangements analogous to the above will allow of an exact representation of all the physical or physiological phenomena which are manifested by visible movements. M. Stein, for example, proposes thus to record the level of tides, now commonly marked by a pencil fixed to a vertical rod attached to a float. M. Neumeyer, of Berlin, has constructed an ingenious apparatus for studying submarine currents, and determining the temperature of the sea bottom. A copper cylindrical box which is attached to the sounding line contains a thermometer and a magnetic needle, which are illuminated by Geissler tubes filled with rarefied nitrogen, through which electric sparks are passed. This light suffices to mark in less than three minutes, on sensitized paper, the image of a mercury column and the position of the magnetized needle. A sort of vane or rudder attached to the box serves to maintain the "lubber's point" of the compass in the direction of the current.

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* *Scientific American.*

Dr. Forel has adopted the same means of investigation to the examination of the causes which produce periodical variations in the transparency of the water of Lake Leman. This water is more transparent in winter than in summer, and in order to determine the extent of this variation, it became necessary to obtain precise numerical data. One method used consisted in placing at the bottom of the lake a box, in which was adjusted under glass a sheet of sensitized paper. This was left for two days exposed to the solar rays which passed through the water. Half of the paper was covered by a screen, so that the degree of colouration could be determined by comparison. On removing the sheet the colour was fixed by hypo solution, and it was then compared with a scale of shades determined in advance. In this way it was found, for example, that in February, at the depth of 160 feet, a colouration represented by 20 was obtained, while during July no effect was visible at the same depth. The limit of obscurity was thus found to be 160 feet in summer and 320 feet in winter. This was verified by noting the depth at which a white disc attached to a sounding line ceased to be visible. M. Forel reached the conclusion that the cause of the variation in the transparence was the presence of organic matters in the water, which distributed themselves differently in summer and winter.

The study of the solar spectrum and other luminous spectra has been greatly advanced by the intervention of photography, which has been the means of recognizing dark lines or spaces in the ultra-violet region, the rays of which produce scarcely any impression on the retina. A large number of such lines have been thus determined by Rutherford, Draper, and Mascart. Similarly, Vogel has made some new discoveries with regard to the obscure rays in the red region. He has found that it is sufficient to mix with collodion colouring matters which absorb the red rays to render it sensitive to the action of such rays, so that the special designation of "chemical rays" applied to those of the violet and ultra-violet region may be considered as obsolete, all the spectral colours being capable of affecting a photographic plate properly prepared.

Photography renders important aid in physical investigations. Bunsen and Roscoe, by the aid of sensitized paper, have measured the changing intensity of solar radiations. Dr. Stein has photographed zigzag lightning. The indented image of the manometric gas flame produced on the rotating mirror has been photographed. Instead of ordinary illuminating gas, cyanogen is now employed, on account of the superior photogenic power of the flame. The rapid oscillations of tense cords and the beatings of the human pulse have also been photographed. The applications of photography to medical studies are numerous and valuable. Without mentioning the faithful reproduction of anatomical preparations, which is facilitated by the injection of coloured liquids, it is possible to send the investigating ray into the depths of the living body. To the opthalmoscope, which reveals the inner eye, the laryngoscope, which shows the interior of the throat, the otoscope, which explores the ear, may be added the sensitized plate on which the image of the impaired organs may be fixed. By the aid of photo-micrography, images of microscopic objects, the rapid alterations in which fatigues and baffles the eye, may be permanently caught. Dr. Duchenne, of Boulogne, has made a complete series of photographs of muscles under the influence of various passions (the electric current being used to produce the necessary contractions), which have been of great assistance to Mr. Darwin in his study of the expression of emotions in man and brutes.

Perhaps most curious of all the applications of photography is its possible adaptation to the discovery of disease. Vogel mentions a case where the face of a sitter appeared in the portrait covered with spots, although none were visible on the skin. On the day following that on which the picture was taken, an eruption did appear, and the person afterwards died of varioloid. The feeble yellow of the incipient pustules had evidently affected the sensitized surface, and the disease had shown itself to the camera before it had been recognized by the doctors. Lastly, we may mention Dr. Ordtmann's suggestion of the value of collections of family photographs in the study of anthropology. He has already begun the collection of large numbers of portraits, and from these he proposes to investigate what modifications selection may exercise on the hereditary transmission of personal characteristics.

REDUCING THE TIME OF EXPOSURE BY AFTER-EXPOSURE.

BY DR. LIESEGANG.*

As I pointed out in the October number of last year, there is used in many studios of England and France a cap for the objective which differs from the one previously described, inasmuch as in place of the opal glass plate it contains a violet coloured tissue paper. The cap is an ordinary objective cap having a circular hole in the centre, whose diameter is somewhat less than that of the object glass; over this hole is stretched a double tissue paper coloured by means of an alcoholic solution of Victoria violet. At the edge of a cap is a pin, on which, as a pivot, there turns a brass plate rather larger than the hole, serving to open and close the latter.

The following is the method of using this cap as explained to me by M. Thiel, in Paris:—Suppose the required time of exposure be fifteen seconds; expose as usual for eight seconds, cover the objective with the cap, and expose for seven seconds under the violet coloured paper; during this latter time there is no occasion for the sitter or object to remain quiet.

According to another account, the exposure must be only half the time usually required. The after-exposure is effected by causing the brass plate to make a complete revolution in one second; then for every three seconds of time saved in the exposure the plate is made to revolve once. During exposure the objective must stand in open sunlight, not in the shade.

Should the negative come out too quickly in developing, in consequence of too long an after-exposure, it must be immediately well rinsed and intensified with pyrogallic acid and silver. If the details do not appear, the after-exposure must have been too short, or the objective was placed in the shade, or the brass plate has revolved too fast.

For my own part, I do not believe that the violet colouring has anything to do with the result; an opal glass fitted into the cap as Melchion proposed produces the same effect; so does after-exposure to a gas-light, as well as many other methods.

In employing any of these methods the whole question depends on the proper proportion of the actual exposure to the after-exposure, a fact which experience alone can determine with accuracy. Whether the light falls on the sensitive plate through the objective, or by any other means, is not of importance, so long as it is not allowed to act for too long or too short a time.

It should be noted that the inventor of the cap above described has patented it in Germany as well as in other countries.

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* *Phographisches Archiv.*

The Photographic News.

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RULE AND LAW IN PHOTOGRAPHIC SOCIETIES.

In all associations of mankind, no matter for what purpose formed, rules or laws are necessary for maintaining the proper relations of individuals to each other and to the general body. Laws unwritten, and even unformulated, will often prevail for a time, until misunderstandings occur which suggest the importance of precisely stated conditions being decided upon, by which the body politic shall be governed. But it is generally recognized that the less laws need enforcing or appealing to, the more happy for the community generally. It has been said, happy is the nation which has no history; and it might be added, happy is the community which is unaware that it has any laws.

But the necessary evil of a code of laws must be accepted in all associated bodies; and these being recognized, the more simple and definite these can be made the better. In photographic societies, in which a number of gentlemen meet to discuss artistic and scientific questions in which they feel a common interest, and in which they feel a common interest, and in which no antagonistic relations of any kind can exist, it should be an easy thing to establish simple rules, easily applied and maintained. Nevertheless, the rules of such societies have more than once proved the occasion of heart-burning and discord. The disastrous disruption in the Photographic Society of London, a few years ago, was originated on alleged imperfections in the rules. This was only a stalking-horse for another motive; but it served. A new code of rules was drawn up, which are confessedly much less satisfactory than the old ones, being inefficient to meet various emergencies, and in some cases self-contradictory. The late Chief Baron Pollock, an eminent lawyer of the widest experience, warned the council, when he was president, of the danger of tinkering laws, or making new ones, if the old ones at all served the purpose. On repeated occasions, lately, complaints have been made that the rules of the South London Society were insufficient to meet cases which frequently arose. We have always heard these complaints with regret; but as they have existed, and latterly been somewhat pertinaciously urged, we think the Society has done very wisely in making its next meeting special for the purpose of reconsidering their rules, and, if need be, revising. We would strongly urge upon the members, however, the importance of not entering upon such a revision in a pragmatical spirit. Let them supply the omissions which manifestly exist; but let them be careful not to multiply rules, but remember how unimportant a part of the Society's rules really are. Rules are made for the Society, not the Society for the rules. A primary omission in the existing rules is the absence of any precise statement of the conditions of membership, and of the conditions under which membership shall cease. It appears that a considerable number of members whose names are on the books have been in the habit of neglecting or delaying compliance with that primary condition of membership in most societies, the payment of the annual subscription. A common, we might say a universal, rule in all societies of the land makes payment in advance imperative; and the genuine list of members of a society is supposed to be taken from the treasurer's book, and to consist only of those who have paid up their subscriptions. A given amount of arrears in many cases makes the membership void, whilst in other cases the arrears only make the membership voidable; that is, non-payment of subscriptions due, in some cases *de facto* terminates membership, whilst in other cases it places upon the committee the duty or the option of terminating the membership of the defaulting member. In the latter case the committee have the unpleasant task of definitely removing a member for non-payment. In a better and simpler arrangement the rules declare that after a certain definitely stated period of arrear the defaulter ceases *de facto* to be a member. In a photographic society, if he still come to the meetings, few persons would probably object that he should still have the privilege of attendance "on the cheap," but no right of voting or of receiving the presentation prints should be granted to any one in arrear.

The question of subscriptions getting into arrear is a trouble in every club, society, or association of this kind. In some cases it seems to arise from a sheer indisposition to part with money; but in most cases it arises from negligence or forgetfulness. Printed applications are commonplace, and are thrown into the waste paper basket as soon as received. Some method of enforcing attention to the fact that the subscription is due and required seems to be wanted. In a society like the South London, where the expenses are not heavy, the want of money is little felt; but when many subscriptions are in arrear this places the treasurer in the uncomfortable predicament of producing a balance sheet showing a deficit; whilst when funds are low, the usual presentation print cannot be purchased and distributed. Some very definite announcement that subscriptions are due, and must be paid within a prescribed time, might be made from the chair to arrest attention, and all self-respecting members should make it a point of honour to pay without delay when the subscriptions are due.

There is one point in connection with such meetings which, although scarcely a matter for definite legislation, is worthy the attention of some societies, and especially of the South London. In this Society an impression often seems to prevail that it is necessary to protract the formal proceedings until as near to ten o'clock as possible, and as many members have to catch trains about or before that hour, they are compelled to hasten away without any facility for that pleasant portion of all such meetings, the informal conversazione which follows the regular proceedings. There is a bye-law in the London Society which forbids the introduction of a fresh subject into the proceedings after nine o'clock, and the president always aims to bring the formal business to a close as soon after nine as convenient, in order to give members opportunity for chat amongst themselves; for examining any specimens of any kind which may have been brought for inspection; and, as a rule, a pleasant half hour after the ordinary proceedings is occupied by an informal conversazione, which is highly enjoyed by the members. The South London might profit by a hint in this direction.

As nothing is more unwholesome in a society than a chronic sense of dissatisfaction amongst any of the members on any subject, it is to be hoped that in the special meeting to be held in June all possible forms of grievance that may have existence will be fully ventilated, so that lurking doubts and dissatisfactions may be dismissed at once and for ever.

TRUSTWORTHINESS OF EMPLOYERS.

A CORRESPNODENT calls our attention to a somewhat peculiar form of grievance to which assistants are occasionally subject. He bases his general complaint on a specific case. Referring to a recent police court case, a report of which appeared in our pages, he states that, in addition to the breach of the law tried, the accused was guilty of making pecuniary engagements which he did not fulfil, our correspondent having been engaged, and, after working for a month, could not get a penny of remuneration. After stating the circumstances, he adds :—

"One of my reasons for writing to you is this, that I consider something ought to be done in reference to a register being kept for the protection of either operators, painters, &c., so that any one, by paying a certain fee, can find out, before taking a fresh berth, what sort of place it is, and whether the character of his employer will bear investigation. Had there been either a registry office or a protection society, I should never have engaged with this man, and thus been saved the great amount of trouble and inconvenience that I have sustained by his scandalous conduct; so I thought that perhaps you might be able editorially to ventilate this idea. Respectable firms ought not to object to such a means of protection for employés, as it would be a sure way of weeding the disreputable men out of the profession, and thus at once tend to make it not only more respectable, but also of a far higher position in the eyes of the world generally. I may add that this is not the only instance of bad conduct to employés by photographers, as I could name several that have come under my own personal knowledge."

That such a case as our correspondent describes is a great hardship cannot be doubted, and that it is desirable to provide a simple remedy if possible. We cannot help feeling, however, that no precautions will offer efficient protection against the action of specious and deliberate swindlers. We fear that anything like an efficient registry of all photographers, with trustworthy data as to their professional and commercial character will be very difficult to secure in a country like England. In a despotic country, where every individual in the state is supposed to have his record, such a registry would not be difficult; but absolutely free institutions seem to be opposed to such records. It would be quite eligible, however, for an assistant to apply to the last assistant as to the character of the employer and the character of the place, just as an employer enquires into the character of a new assistant and why he left his last engagement. Such a plan, it is possible, might be resented by some employers; but no plan would be entirely free from all objection. If any of our correspondents have suggestions to offer, we shall have pleasure in giving them publicity.

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FRENCH CORRESPONDENCE.

The English Photographs at the International Exhibition—French Photographic Society—Warnerke on Solarization—Visitors to Paris.

I have very great pleasure in being able at so early a period to assure the readers of the Photographic News of the high position taken by English photographers at the International Exhibition. I spent a whole morning in examining the specimens sent by them, and was by no means alone in my admiration.

First let me, in a few words, describe the arrangements. As most of my readers are doubtless already aware, the space alloted to the United Kingdom in the building on the *Champs de Mars* adjoins the Seine, and is on the right hand side of the *Pont de Jena* coming from the Trocadero. On the side abutting on the *Avenue des Facades Etrangeres*, which extends irom the Grand Vestibule as far as the Ecole Militaire, this English space is flanked by large windows of roughened glass, and between these have been erected a number of screens nine feet high, so as to form a series of well-lighted bays. The photographs from England are shown on these screens. Professional men, French as well as foreigners, attracted by national curiosity, have all been to see this part of the Exhibition; and from all sides I have heard nothing but unanimous expressions of praise.

The first frames to strike the eye are those exhibited by Mr. Maltby, containing, not only some well-marked portraits, but more especially a numerous series of delicate landscapes, to which a sky, lightly indicated, gives a very natural appearance. Next come some most interesting specimens of the work of the Autotype Company. These exhibitors have had the happy idea of showing proofs of different sizes taken on the various tissues which they prepare with different coloured pigments, so that an opinion may be formed of the effect of each one. Their specimens exhibit the great variety of results which can be produced by employing different kinds of paper, so that an excellent idea can be formed of the advantages to be derived from the carbon process.

The photographs shown by Messrs. Elliott and Fry have the effect of making us imagine that we have before our eyes magnificent drawings by the great masters, softened by the stump, and embellished by delicate touches in red chalk. How these beautiful portraits are obtained, portraits the size of life, perfectly modelled, and with the flesh tints skilfully expressed—whether by some special method of printing, or by dexterous retouching—I am quite unable to say; but the effect obtained is most happy and artistic. More particularly there are two profiles of young girls on which the best painters would have been glad to have inscribed their names.

With the greatest pleasure I have again found the signature of Mr. Vernon Heath (whose works I have followed for a number of years) attached to some splendid landscape views taken on the banks of the Thames and in the Island of Skye; it is impossible to realize more complete results. These photographs are great not only by reason of their size (some of them are at least 60 c. by 50 c.), but also on account of the artistic feeling shown in the choice of subjects.

Mr. York has sent a collection of instantaneous pictures of animals, so life-like that the subjects seem to have sat for their portraits. The same may be said of similar studies exhibited by Mr. Alfred Fisk, and also by Mr. Hedges. Among the portrait photographs executed by Mr. Slingsby should more especially be noticed one of an old lady, which is really a *chef-d'œuvre* as regards both delicacy and modelling.

Mr. Robinson has sent too few of those compositions for which he is celebrated, and in which the excellence of execution rivals the artistic talent that can so wonderfully bend photography to the imagination. "Alone," "When the Day's Work is Done," and "Preparing Spring Flowers for the Market," are genre pictures of the highest merit. They might be taken for copies of the best masters of the Flemish school.

The landscape studies of Mr. Payne Jennings exhibited by the artist under the title of "English Scenery," and "Irish Scenery," are already attracting the special notice of visitors. These pictures are so transparent and velvety, that they seem to have been printed by some new process that has been brought to a singular state of perfection. Mr. Bedford's charming views are no less interesting, although they present a quite different effect. They look like delicate steel engravings. As for Mr. W. England, he exhibits a selection of his views in Savoy, before which visitors remain a long time lost in admiration.

A beautiful life-size portrait of the Princess of Wales is exhibited by Messrs. Downing. The enlargement of the original negative has been executed by the Autotype Company, to whom it does the greatest credit. I have also to notice a collection of views of English Cathedrals by Mr. Whiting; some children's portraits by Messrs

Robert Faulkner and Co., perfectly successful, notwithstanding the difficulty of posing and exposure; and a series of portraits by the London Stereoscopic Company of persons distinguished in the political, literary, and artistic world.

Those whom I have above enumerated are the principal English photographers whose works, up to the present, occupy a place at the International Exhibition. I have only to add that they fill the space allotted to them in a manner worthy of their reputation.

For want of space I am unable to give a detailed account of the monthly meeting of the *Societe de Photographie* which took place on Friday last, the 3rd of May. However, only one communication was read sufficiently interesting to be worthy of notice: I mean the one on solarization by Mr. Warnerke, who is just now on a visit to Paris. In addition, some specimens of new works were submitted to the meeting, and notably the first two numbers of a magnificent work on "The History of Tapestry," illustrated with plates in chromo-photography and glypto-photography executed by M. Leon Vidal.

Since the opening of the Exhibition I have already had the pleasure of receiving several visitors, among them Messrs. England and Warnerke, as well as Mr. W. A. Brice, the inventor of the photographon. I hope that all the readers of the Photographic News who may visit Paris during the Exhibition will not forget that it will be a great pleasure to me to receive a visit from them, and that I shall be happy to do anything in my power to be of use to them, or to render their stay in this city pleasant and interesting. Ernest Lacan.

19, *Avenue de la Grande Armee, Arc de Triomphe de l'Etoile.*

FORMS OF COMPOSITION.

BY W. HEIGHWAY.

The object of composition is so to place the matter of the work before the eye of the person looking at it, that (supposing him to be tolerably intelligent and sensitive) he may be able to grasp the intention, motive, and scope of the work, and to sympathize with it.

On the arrangement or composition of the materials of the picture depends mainly the entire effect—not alone of the first impression it conveys to the eye, but the moral and intellectual effect it produces on the mind of the spectator.

The principal object should be to have ideas and feeling worthy of representation, and then to produce them in such a manner that the spectator may seize on the salient points, and be able to form a correct impression of the meaning of the picture at once. The composition, if it be true to the laws of art, will at once declare its meaning, and, after reading, will make further revelations, not obscure or falsify the first impressions.

The thoughts in your picture should be produced in such relation and order that the eye of the beholder shall see them through your eyes; this is to say, that your ideas shall be so set down that there can be no misreading.

The leading idea coming first in importance, so that even an uninformed mind, which does not know the motive of the picture, may catch it with some ease, from the prominence given it in attractiveness, interest, or colour—or else it must be *pointed to*, so to speak, by some specially conspicuous object.

In the photographic portrait these more subtle rules of composition do not commend themselves to the artist as being generally adaptable in the studio, and with the means at his command. But yet much more might they be enlisted to our service than they are, to give variety and originality to our work.

(It is not because we have been hammering away at one syllable words all this time that we should not have a go-in at two syllables—nor because we have been using the humblest means that we should not aim at the very highest.

This prominence of the great object of interest may be given in many ways. The concentration of light or dark to a particular spot, the burst of light leading the eye to the point on which it is desired to centre the interest. The nobility of the object itself, aided by the care the artist has bestowed on bringing out the best points, and the subordination of all the surroundings, that they may not detract from the central idea.

A picture, unlike a stage representation, where to a certain extent the interest is shifting, must find its chief beauty in its leading idea, and the most successful composition is that which surrounds a beautiful object or interesting idea with others subordinate to it, to assist it by harmony or contrast to produce an artistic unity.

In the arrangement of objects in a picture, it will be recognized at once that any obvious and laboured reproduction of any given form of composition must be painful. A bald and hard symmetrical form, either of light and darks or in the arrangement of the lines, would be obviously defective, and must prove offensive to the eye.

A certain degree of regularity arising from an appreciation of the rules of art composition, and the proper grouping together of the parts of the picture, with concentration of interest, are, however, greatly to be preferred to a wild scattering of lights and shadows, a drunkenness of the lines and a general promiscuousness which can only result in pitiable confusion.

In all inventive or creative occupations, imagination and the habit or faculty of observation, with the power of rapid and truthful association and connection of idea, make the artist. These powers are capable of cultivation; without them the worker is a machine, soulless and unimaginative. But still they can be too largely developed, too highly cultivated, and the consequence is that the artist degenerates into a gushing driveller. No habit of mind can be so distressing as that of trying to be so desperately imaginative about everything one sees—it grows confoundedly monotonous.

Fancy trying to cast the halo of poetic romance round a towel-horse!

It will be generally seen that the works of the great masters of painting appear to have been designed in obedience to some fixed principle; the most pleasing forms being those based on the pyramid or triangle, and the circle with its various modifications. The square form, being much less picturesque and sympathetic of artistic treatment, has never been adopted, except for special reasons. If, for instance, monotony is to be expressed, nothing better than good honest horizontal and uncompromising perpendicular lines could be adopted.

(Can it be that this has been the leading idea of our photographic artists when "posing" their groups? It has never been suggested, I believe, before; but perhaps it is nevertheless true. And how successful has been the result!)

Give these forms of composition, as they are set down in the works of the great masters, close and earnest study. In following them, do not allow your art to become too apparent in your work.

ON THE FADING OF CARBON PRINTS, AND THE MEANS OF AVOIDING IT.

BY DR. AD. OTT.*

Among some photographers, complaints of the instability of colour in carbon prints—colour which was supposed to be so peculiarly permanent—have recently become common. It is alleged that the prints, after exposure to sunlight for a few weeks, change their colour, especially those having a rich purple tone becoming of a dark dingy green. One of my correspondents, a well known photographer on the banks of the Rhine, writes to me:—"Induced by the eulogiums in the professional journals to replace the silver prints in my show window by carbon pictures, I now exhibit a series of *grass-green* portraits which are worse in every respect than the old ones, yellow and ugly as they were. If this be the result of the new permanent process, every one should be warned against using it." Accompanying this letter was a portrait of which the part that had been protected from the light was still brilliant in all the glory of a rich purple tint, while the remainder had a green, almost verging on black, but not by any means a *grass-green* colour.

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* *Photographisches Wochenblatt.*

In order to determine the cause of this rapid alteration of colour, it was first of all necessary to find out what colouring material besides black had been used in the preparation of the paper on which the print was taken. A very few experiments sufficed to convince me that the purple tone of the print in its original state was due to the presence of carmine. I therefore obtained a print on pigment paper containing carmine, and washed for an hour in cold water to get rid of the bichromate; after drying I covered up one half of it, and exposed the other half for eight days to strong sunlight. At the end of this time I was unable to detect the smallest alteration in colour. From this paper I then cut a piece off, and dipped it in a bath containing a four per cent. solution of potassium bichromate, and submitted it, without previous washing, to the action of light. In a few days the purple tint was gone, and in its place there was a dark green, by no means pleasing, colour. The proofs obtained in these experiments I enclose for your inspection.* It was thus clearly shown that inadequate washing was the sole cause of the rapid discolouration of the print with which I experimented.

It is interesting to learn that the well-known Belgian *savant*, Dr. Monckhoven, himself a manufacturer of pigment papers, has recently been endeavouring to prove that all carbon prints containing, in addition to carbon, some organic colouring substance, will, in the course of time, suffer a change of tint. The cause of this change is, as he alleges, a chromium chromate which is not soluble in water, and, therefore, cannot be washed out; this salt, being an oxidizing agent, decomposes organic colouring substances more especially, and, before all others, the red ones. Green chromic oxide is the inorganic product of the decomposition. Dr. Monckhoven also proposes a remedy against this change of colour: this consists in washing the print thoroughly for some minutes in a five-per cent. bath of sodium bisulphite instead of in an alum solution. By this means any salt of chromic oxide which may be present is immediately reduced, and remains in the paper as a perfectly inert substance. Persons of an anxious disposition may, if they please, adopt this method; for my part I believe a thorough washing, of at least an hour's duration, will answer all purposes, more especially as the proofs offered by Dr. Monckhoven for the correctness of his views are not quite above all doubt.

The researches which are at present being conducted in various quarters will probably throw more light on this subject; but in the meanwhile it may moderate the forebodings of anxious disciples of the carbon process to know that the house of Braun and Co., which has pursued that process with so much zeal and assiduity, will, for the future, employ in the manufacture of their pigment papers only those colouring substances that are perfectly neutral in the presence of even stronger oxidizing agents than the chromium salts. It is to be hoped that these remarks will lead to more careful work in the practice of carbon printing.

TO SENSITISE CARBON PAPER WITHOUT THE CHROMATE BATH.

BY DR. V. MONCKHOVEN.*

Dip ordinary carbon paper in a twenty per cent. solution in water of ammonia-citrate of iron, dry it in the dark, expose it in the copying frame, moisten it, and transfer it in the usual way to the glass plate. Developing with warm water, no image will become visible; but if after exposure the paper be dipped in a solution of potassium dichromate instead of in water, and then immediately transferred to the glass plate and developed with warm water, an image will be obtained; this is because the action of the light is transferred from the ferric to the chromic salt. In place of potassium bichromate, mercury, chloride, or other salts, which, on a future occasion, I will describe, can be used. If tannin be employed, the action of the light is reversed; instead of a positive, a negative is obtained.

In place of a salt of iron, one of the other metals can be used, whose bases possess different degrees of oxidising power. The greatest difficulty that I met with in this process was to preserve the half tones.

Correspondence.

THE FERROUS OXALATE DEVELOPER.

Dear Sir,—I have two slight remarks to make about the using of ferrous oxalate developer.

Firstly. Opalescent streaks sometimes occur when this developer is used. These are probably due to the formation of oxalate of lime in conjunction with the use of water containing lime for washing the plates subsequent to development. These streaks—which, however, are not very detrimental to the printing qualities of the negative—will be avoided if rain or distilled water be used for washing the plates instead of tap-water.

Secondly. I find that ferrous oxalate solution advantageously replaces the nitrate of silver, Schlippe's salts, or other of the chemicals now commonly used for blackening the image after treatment with bromide of copper.—Very truly yours, Joseph W. Swan.

Mosley Street, Newcastle-upon-Tyne, May 4th.

SUMMER EXHIBITION OF PHOTOGRAPHS.

Dear Sir,—As the letter which Mr. Grant wrote in my name, and which you thought it desirable to publish in your last impression, was simply an announcement that the Exhibition proposed to be opened during this present season in the above galleries would not take place, I think it advisable to supplement that letter with some further observations upon the subject.

Anticipating your generous permission to avail myself of your columns for that purpose, I must, in the first instance, thank you for the valuable and liberally-minded expressions of approval with which you received the proposal some weeks ago, and again now, when I have been compelled to announce that for the present the Exhibition could not be held.

In as short a space as possible I will explain the reasons which actuated me in proposing that an exhibition of photographs should be established during the London season proper. The advantages in respect to the convenience and presence of the art-world, both patron and connoisseur, are obvious; everyone of position and influence visits London at some time or other during the season, and therefore the success of a well-selected representative exhibition of photographs would be, it may be fairly assumed, assured.

The advantage, therefore, of such an exhibition being granted, the opportunity for holding it is next to be considered. Attached to the above rooms are galleries which to my mind presented that opportunity, and I therefore offered them to the free use of the profession. Thirty gentlemen, accepting that offer in the sincere and unselfish spirit in which it was made, promised to exhibit, and to them I tender my thanks for the confidence which they thus reposed in me. Thirty exhibitors, however, would not, it must be admitted, form a fair representation of the whole profession, and for the present, therefore, I deemed it wise to defer the attempt.

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* The specimens submitted by Dr. Ott afford a striking proof of the correctness of his views.

*Photographisches Archiv.

I now renew the offer, not for this, but for next season, and I shall be happy to receive the names of any gentlemen who may be inclined to support me in the proposal I have made. —I am, dear sir, yours faithfully, Alexander Bassano.

PS.—I may mention that the galleries which I would have set apart for the exhibition are quite unconnected with my own business premises; they were built by a former tenant for the purposes of exhibition rooms, are admirably suited for those purposes, and are well known to the frequenters of the West End of London.

BRISTOL AND WEST OF ENGLAND INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

Dear Sir,—As the intention to hold the above at the end of this year has got considerably abroad, I write to you just to state that, looking at the unsettled state of things at home and abroad, it has been decided to postpone it till *December* 1879, all things being favourable.—Faithfully yours,

H. A. H. Daniel, Hon. Sec.

FADING OF SILVER PRINTS.

Dear Sir,—The fading of silver prints is a disease which every photographer would be glad to get rid of; that being the case, it behoves every photographer to try and find out the cause, and, if possible, the remedy. There are three known causes, viz.:—

1st. Not thoroughly eliminating every trace of the hypo.

2nd. The mounting board. There is one particular kind of board known as "Antichlor." Prints mounted on this are sure to decompose. Prints are less liable to fade on enamelled mounts, the enamel affording a protection.

3rd. The kind of albumen used. There are certain German papers which give a very offensive smell. Prints on these are very liable to fade. Fresh and pure albumen is very conducive to permanency in prints. Silver prints are found to be far more permanent in a dry than a moist atmosphere. There are permanent and unfading pictures, it is true; but we believe that for small pictures nothing can surpass a good silver print. Look at an Autotype picture—no gradation of detail, no softness, no delicate lines, nothing but black-and-white. In my opinion, Autotype is only suitable for large pictures.—Yours truly, Huffell & Co.

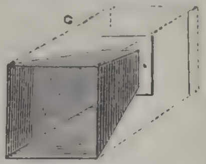
[We quite coincide with our correspondent on the importance of trying to secure permanent silver prints; but we cannot endorse his opinion of carbon. We constantly see carbon prints which quite equal, if they do not surpass, the finest silver prints in all respects.—Ed.]

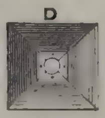
LIGHT ENTERING CAMERA.

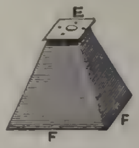
Sir,—I forward you a rough sketch of a contrivance I thought of, and have adopted in all my cameras. It is a certain guard against fog from a bad sliding camera, and I find the pictures sharper and better defined, as the light from the lens is carried evenly on the sensitive plate. There are no shadows from the corners of the camera, nor harbour for dust.

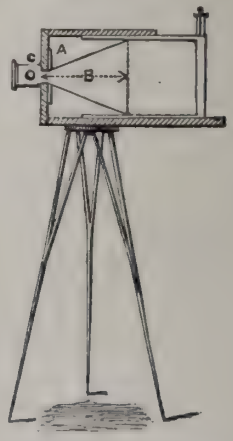
I have never submitted this to any practical photographer, but seeing so many suggestions for improvements, I thought it might perhaps be worth while to suggest the idea to the profession.

I make the funnel with quarter-inch seasoned mahogany to fit inside sliding body of camera, and fasten to the front of camera inside, by four screws. AB is the funnel, just the length of camera when closed; C is the lens; D shows the funnel, looking from the ground glass when focussing with round hole size of lens; the dotted lines show piece of wood (the funnel is fastened); the four black dots the screw holes to fasten to end of camera; E is the funnel (bottom up), showing the piece on the end to screw to the end of the camera; F F must be exact size of inside sliding part of camera; G is the funnel ready to screw into the camera.









I shall be glad to give any further information if required.—I am, sir, yours, W. Basham.

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting was held in the hall of the Society of Arts on the evening of Thursday, May 2nd, the Rev. F. F. Statham, M.A., in the chair. The minutes of a previous meeting were read and confirmed.

Referring to the recent death of Mr. J. A. Spencer, a member of the Society, the Secretary was directed to write to Mrs. Spencer a letter expressing the sympathy of the Society.

After the discussion of some matters of business it was resolved that the June meeting be made special, to consider and revise the rules, and to attend to other points of a business character.

Mr. W. Brooks then read a paper "On Reproduction and Enlargement of Negatives on Emulsion Plates." Some very excellent prints were shown from reproduced negatives, together with prints from the original plates, and members were challenged to detect any difference.

Mr. Bridge, in answer to the Chairman, said his experience in enlargement lay in another direction. He should quite think that Mr. Brooks' method would be available by artificial light, and intended to try it. He had enlarged a lantern slide to half-plate in a lantern with six-inch condenser, and obtained a good result on an emulsion plate in an exposure of twenty seconds.

Mr. Foxlee said he had been under the impression that for reproducing or enlarging negatives nothing could touch carbon; but he was satisfied that this was as good, and as free from grain and texture. In fact, the results surpassed anything he had seen.

Mr. **Brooks**, in answer to a question, said the original negatives were by the wet collodion process taken several years ago. He regarded the freedom from texture as being due to the use of the alkaline developer.

Mr. **Foxlee** said he had demonstrated some years ago that freedom from texture might be secured on simply iodized plates with pyro development.

The discussion became desultory and conversational.

Mr. **Brooks**, in answer to questions, insisted on the importance of commencing the development with a small proportion of pyrogallic acid. He used a washed emulsion, but believed any emulsion would do. He preferred moist emulsion where it was available. He used common glycerine when it was necessary to keep the plate moist, paying for it tenpence a pound.

Mr. **Harrison** showed a small cheap dark slide.

Mr. **Wratten** exhibited some prints from gelatine emulsion plates.

A print from a negative of a cave interior lit up by half-a-dozen paraffin lamps was shown, and the proceedings terminated.

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting of this Society was held at the usual place of meeting, the Museum, Queen's Road, Bristol, on Wednesday, May 2nd, Colonel **Biggs** in the chair.

The minutes having been read and confirmed, two gentlemen were elected, Rev. C. Harg, of near Frome, as ordinary, and Mr. L. Miles, of Cardiff, as corresponding, members.

Colonel **Biggs** then read a paper entitled, "The Calotype Process." It explained in a most clear and practical manner the whole formulæ and details of the process, being essentially a most interesting communication. The enjoyment of the paper was also greatly heightened by the presence of a large number of the exquisite productions of the reader while in India, the majority being of large size.

It was remarked by many that it seemed a great pity that a process yielding such beautifully harmonious pictures should have fallen almost entirely into disuse.

Mr. **Holt** suggested an attempt at finding some suitable flexible substance instead of glass, for exposing the sensitive paper between, as then it might be used with a roller dark slide, but

Colonel **Biggs** feared that could not be effected, as the paper must be kept damp, therefore considerable compression was required.

Mr. H. A. H. **Daniel** remarked upon the great delicacy of detail and beautiful atmospheric effect obtained in the negatives before the meeting, and said every one must have noticed the great absence of granularity in the appearance of the pictures, and considered that for large work the results could be considered *very little* inferior, if any, to those of glass negatives.

Col. **Biggs** also pointed out the great advantage of the extreme lightness of the sensitized surfaces as compared with a box of (say) fifteen by twelve dry plates.

Mr. E. **Brightman** said that since seeing one or two of the very fine results exhibited by Col. Biggs at a previous meeting, he had many times felt very anxious to make a trial of the process, which Col. Biggs' valuable paper had now rendered not only possible, but most clear.

A vote of thanks, proposed by Mr. Daniel and seconded by Mr. Brightman, was accorded to Colonel Biggs for his most interesting and instructive paper.

The **Secretary** then reminded the meeting that it was the last indoor meeting of the session, and that after a council meeting had been held, the first out-door meeting would probably take place in the first week of June.

Talk in the Studio.

Photographic Society of Great Britain.—The next meeting of this Society will take place at 5, Pall Mall East (when the summer exhibition of the Water Colour Society will be on view), on Tuesday, May 14th, when papers will be read on "Dry-plate Processes," by Mr. W. England, and "On Photography at the Least Refrangible End of the Spectrum," by Captain Abney, R.E., F.R.S.

Photographic Progress Viewed from the Outside.—It is sometimes amusing to note how little of the progress of an art is known outside its circle even by intelligent and well informed people. Our excellent contemporary *Chambers's Journal*, one of the best conducted journals of its kind, has apparently just heard of bromide of silver emulsion plates, and in its last monthly review of scientific progress gives the following:—"An invention which simplifies photography out of doors may be said to have claims on the attention of tourists and travellers, as well as of professional photographers. To carry the bottles, liquids, and other appliances at present required necessitates troublesome baggage; but Mr. Chardon, of Paris, shows that all this may be avoided by the use of his 'Dry bromide of silver emulsion.' This preparation, a mixture of collodion and the bromide, will keep an indefinite time in bottles excluded from the light, and does not suffer from varying temperatures. Specimens carried to China and back by way of the Red Sea underwent no alteration—an important consideration for travellers and astronomers who wish to take photographs in tropical countries. When required for use the bromide is mixed in certain proportions with ether and alcohol; the plates are coated with this solution, and as soon as dry are ready for the photographer. They require no further preparation, and retain their sensibility through many months. The image may be developed immediately, or after some weeks, according to circumstances; in proof of which photographs taken at Aden have been developed in Paris. But a very small quantity of water is necessary, and the image may be transferred to a film of gelatine or a sheet of paper at pleasure, which lessens the risk of breakage, and the plates may be used for fresh pictures." It would probably surprise the writer to learn that this invention is nearly fourteen years old, is of English origin, and that the process recently put forth by M. Chardon is not claimed by that gentleman as other than an English emulsion process, or combination of such processes, which he has worked out with care and success. The summary of its claims and advantages given by our contemporary is very interesting and well put.

Municipal Dignitaries.—It is said that Mr. Fradelle, of Regent Street, is framing a collection of photo mezzo-tint portraits of municipal dignitaries of Great Britain.

Deodorizing India-rubber.—The *Stationer* says that the disagreeable odour of india-rubber occasioned by the sulphur which adheres to the surface when vulcanized may be obviated by steeping the rubber in a solution of sulphuret of carbon.

To Correspondents.

Focus June.—The Paris journals devoted to photography are the *Bulletin* of the French Society, published monthly, and the *Moniteur de la Photographie*, published fortnightly, and edited by M. Ernest Lacan. You had better communicate with him; his address is 21, Avenue de la Grande Armee.

Alpha.—If you have facility you will find four or five feet more in length a great advantage in taking groups, &c.; otherwise the proportions are good. Height to eaves, 6 or 7 feet; to ridge, 12 or 13 feet. Amount opaque at sitter's end, 5 or 6 feet; at camera end, 3 or 4 feet. This relates to side and roof. On N.W. side, glass to within 20 inches of ground. On S.E., the amount opaque side and roof, 7 feet at each end. Sash doors in S.E. are the simplest aids to ventilation. You may gain some advantages in light by making the ridge out of the middle by about a couple of feet; the roof light then on the N.W. side will admit a fine body of light. We imagine that no serious difficulty will stand in the way of ceiling the opaque portion of roof, but that is a point upon which your architect or builder will advise you best.

C. C. Cox.—We cannot account for your bath working slow. Possibly it contains more acid than you suppose. Try the addition of a little carbonate of silver. The method to which you refer was carried out as you suppose. The paper was treated with nitrate of potash, dried, and burned in a sheet iron tray in the open air, to secure as perfect combustion as possible. The ashes were then treated with dilute nitric acid, and it was alleged that the whole of the silver was thus obtained as crude nitrate. We have not tried that method. Any of the dealers will supply the paper for collodion transfers.

A. N. W. (Penang).—The production of pinholes from supersaturation with iodide of silver occurs much more readily in hot weather than otherwise, because the iodide of silver is less soluble in warm silver solutions than in cold. Hence many photographers keep the negative bath surrounded with ice in the very hot weather. There is no absolute remedy, but many palliatives. Nitrate of baryta is, we fear, of little use on such occasions. The addition of a few drops of hydrochloric acid, causing a precipitate of chloride of silver, which takes down with it a portion of the iodide of silver, is often useful; adding the silver bath to twice its bulk of distilled water. Filtering and strengthening is also useful. Working a bath, with the tendency to pinholes, with an under-iodized collodion is said to check the formation of pinholes. 2. The nitrate bath can be made useful for printing; but it is important to get rid of the iodide first, as the presence of iodide in the printing-bath is very troublesome, and seriously interferes with toning. The method given by Hardwick is pretty good, but not absolutely satisfactory. We do not see any advantage in modifying or changing your collodion. Bromized collodion, without iodide, is not desirable in the ordinary wet process. 3. The terms you mention, "barium nitrate" and nitrate of barytes," &c., indicate the same article.

Young Photo.—The chief causes of matt silver stains is the use of a horny, repellent collodion. With a ripe porous collodion they scarcely ever occur; but when a tough, horny collodion is used, the film being non-absorbent, the silver solution on the surface runs into streams, or stands in little pools on the surface, and if the weather be warm, so as to concentrate these little pools by evaporation, they form stains of reduced silver the moment they are touched by the developer. The first step is, therefore, to change the collodion, or change its character. The addition of a few drops per ounce of distilled water to the collodion, and shaking well, will often remove the horny, repellent character of the collodion. The addition of a drop or two of glycerine to the collodion sometimes proves a remedy, but it sometimes causes fog. The use of a second silver bath containing ten grains of nitrate to the ounce and one ounce of glycerine to a pint of bath will often effect a cure. Place wet blotting-paper behind the plate, and keep the temperature of the room cool.

Oxide.—To clean a tarnished Daguerreotype, remove it from the case and glass, brush away any dust with a soft camel's hair brush, and wash by flowing distilled water over the plate. If it run greasy, wash with alcohol until it flows without greasy lines, then apply distilled water until it flow evenly; then apply a twenty-grain solution of cyanide of potassium. This will rapidly remove the tarnish and discolouration. As soon as it has disappeared, wash again with water thoroughly. If the cyanide be too strong, or applied too long, it will at times destroy half-tone. After washing well, dry by applying the flame of a spirit lamp to the back of the plate.

Amateur.—The best mode of reducing your chloride of silver is to reduce it by heat in a crucible, first adding a flux of an equal weight of mixed carbonates of soda and potash. The metallic silver obtained by reducing the chloride may then be converted into nitrate by dissolving it in dilute nitric acid.

J. L.—We do not remember any process for copying tracings direct, and obtaining the blue image on a white ground, but that of M. Pellet, which we have recently published. The fact that the whole of the paper darkens suggests that it is not sufficiently protected from light before exposure, or that it is over-exposed, or that the tracing forming the cliché is wanting in contrast. 2. Most of the dealers keep the large earthenware dishes. We have recently seen some at Solomon's warehouse.

Tyro.—There are various causes for insolubility of carbon tissue. The most probable cause in your case is the use of a too strong solution of bichromate: twenty grains to the ounce is, we think, the outside strength we should use; and in warm weather ten grains are sufficient. Slow drying in damp weather is also a cause. Keeping in a sensitive state too long is a common cause. Sometimes the quality of the tissue is in fault, but rarely in these days. It is a bad plan to immerse the exposed tissue in hot water to begin with. Commence with cold water, and then raise to 100°, not higher.

R. G.—We should think that the paper being old, and hard, and very dry, was the cause of its non-filtering quality. Place it in a damp place, or in warm water, and then dry. It seems so hard and dry of surface that it repels water.

O. E.—"Hearn's Practical Printer" cannot be had at present, as all those sent to this country are sold. Bendann's Backgrounds may be had, we believe, of Mr. Atkinson, of Liverpool.

Deaf and Dumb Artist.—The statements made in prospectuses are often much exaggerated. We should prefer No. 3D, so far as our information goes.

Several Correspondents in our next.

METEOROLOGICAL REPORT FOR MARCH.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven,
36 *feet above sea-level.*

Date.	Barometric Pressure. Morning.	Noon.	Night.	Temperature in the Shade. Morning.	Noon.	Night.	REMARKS.
1	29·21	29·21	29·25	48°	48°	47	Rain all day
2	29·62	29·78	29·90	47	50	44	Fair and sunny
3	30·04	30·11	30·11	48	50	47	Fair and sunny
4	30·16	30·16	30·00	48	48	46	Rain p.m. Gloomy all day
5	30·12	30·09	29·98	46	48	48	Fair, but gloomy. Wind
6	29·70	29·64	29·80	49	48	47	Heavy showers a.m. and p.m.
7	29·80	29·78	29·60	48	49	45·6	Rain a.m. and p.m. Wind
8	29·80	29·88	29·98	43	44	42	Slight showers a.m. and p.m. Windy
9	29·99	29·89	29·73	39	42	43	Rain p.m.
10	29·80	29·89	29·92	46	46	47·5	Showers this evening. Generally cloudy
11	29·95	29·93	29·93	45	51·5	44	Showers a.m. and p.m.
12	30·11	—	30·06	40	—	39·5	Fair and sunny
13	30·28	30·32	30·4	34	43	44	Fair and sunny
14	30·38	30·38	30·29	45·5	—	34	Fair, generally sunny
15	30·30	30·40	30·44	33	46	45	Fair and sunny
16	30·50	—	30·48	43	—	42	Fair, generally sunny
17	30·40	30·39	30·30	46	46	47	A little rain this afternoon
18	30·19	30·15	30·14	47	49·5	48	Fair, generally sunny
19	30·17	30·19	30·22	47·5	52	48	Fair, generally sunny
20	30·23	30·27	30·23	47·5	54	48·5	Fair, generally sunny
21	30·11	30·07	30·09	47	52	40·5	Fair and sunny. Strong wind this evening
22	29·91	29·89	29·80	36	42	30·5	Showers of snow p.m.
23	29·68	29·60	29·58	36	41	31	Fair, generally sunny
24	29·38	29·37	29·42	34	36	29	Snow a.m. and p.m. Wind. Lightning at night
25	29·68	29·75	29·81	36	42	33	Fair, generally sunny
26	29·89	29·62	29·68	32	43	42·5	Rain at night. Gloomy all day. Wind
27	29·67	29·60	29·62	36	—	—	Fair, generally bright
28	29·48	29·40	29·38	36·5	42	35	Fair, generally bright
29	29·41	—	29·42	38	43	35	Snow showers p.m.
30	29·32	29·36	29·38	36	43·5	36	Showers of snow a.m. and p.m.
31	—	—	29·01	35	35	38	Snow showers a.m. and p.m.

Summary.	Mornings.	Noons.	Nights
Highest temperature observed	49	54	48
Lowest ditto	32	35	29
Mean ditto	41·7	45·8	41·4

Mean of all observations 43

Number of days on which rain fell	15
Number of fair days	16
Number of fair days bright	15
Number of fair days gloomy	1

◆

PHOTOGRAPHS REGISTERED.

Mr. J. D. Francis, Strand, W.C.,
Photograph from painting "The Golden Hugh."

Mr. A. Hendrey, Godmanchester,
Photograph of Rev. H. Mather.

Mr. W. Green, Berwick, N.B.,
Photograph of late R. N. Wornam.

Mr. Gregson, Luton,
Three photographs of Rev. J. H. Blake.
Two photographs of Mr. J. Cumberland.

Messrs. Bacon & Johnson, Bishop Auckland,
Photograph of the late Mr. J. Henderson.

Mr. H. Penn, Birmingham,
Two photographs of Rev. A. Mursell.

Mr. Pointer, Brighton,
Four photographs of Dogs.
Photograph entitled "St. Patrick's Day in the Morning."
Photograph entitled "He has Lost."
Photograph entitled "Triple Alliance."

Mr. H. R. Willett, Bristol,
Four photographs of Sydney Fletcher.

Messrs. G. & R. Lavis, Eastborne,
Photograph of Mr. G. Vulliamy.

Mr. W. T. Lye, Luton,
Photograph of himself.

Mr. J. Yeoman, Bedale, Yorks,
Photographic group of thirty-two Wesleyan Ministers, &c.

Mr. Allanson, Bridlington,
Two photographs of Rev. R. P. Blakeney, D.D.

Mr. Lord, Huddersfield,
Two photographs of Henry Vincent.

The Photographic News, May 17, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Notes on Poses—The Latest Invention—The French Exhibition.

Notes on Poses.—The thumb-nail sketches of the Academy and Grosvenor Gallery suggest hints for the portrait photographer. In these annual exhibitions the portraits, it is true, are always the weakest parts about them, but this is because the painting of portraits is in itself one of the most difficult branches of the art. Not one portrait in ten one sees exhibited is happy so far as pose and expression are concerned, as all will concede, quite as much as the fact that from year to year many good pictures of this kind are to be seen hanging upon the walls. It takes a good artist to be a portrait painter, and that is why those who show ability in this capacity are elected young into the Academy. In most portrait paintings one sees, the face is tolerably like, but the pose—and grouping, if more than one person is present—generally leaves much to be desired. It is a difficult matter to pose with grace and ease, as every artist knows, whether he employs the palette or the camera, and therefore, when a good study has been produced, it is a thousand pities the same is not more thoroughly inspected and considered. The London photographer should never omit to look at the more successful portraits in the Academy, and, if possible, secure thumb-nail sketches of them. Unfortunately, Mr. Henry Blackburn's clever notes bear reference more especially to landscapes and pictures, as opposed to portraits, and from a portrait photographer's point of view are consequently of less value. But to all disciples of the camera his little volume will be found of value. For the most part the little outline sketches are from the hands of the authors themselves, and the skeleton thus furnished of their work affords much study to the careful photographer. The naked chiaroscuro of a picture is perhaps more marked here than in the original, for all the salient parts are here without the general effect. A collection of such skeletons or outlines, and especially if they concern portraiture, are particularly valuable. Rejlander never let a good pose escape him; he always had his eyes open for an easy and graceful posture, and made a mental or graphic note of anything he saw. In an omnibus, in the railway, or wherever he might be, he was on the lookout for an elegant or natural pose, and he frequently exhibited to us a rough sketch he had taken on the instant of a lady or gentleman in his presence, whose pose he repeated before the camera as soon as he returned home. "Just like a German student," he once remarked in our hearing, pointing to a long-haired, fair-mustached man; and most of our readers know that the majority of his successful pictures were secured from models whom he had met in public, and to whom he had got himself introduced one way or another. People who admired his works were wont very frequently to say what a fortunate man he was to have secured such good models, who could give themselves such easy attitudes; but it was just this discretion on the part of Rejlander which constituted him a thorough artist. Playwrights and litterateurs are frequently known to take notes of any witty or crisp observations they may hear, in order to make use of them in their work; and photographers, who have so much posing and attitudinising to do, would act well in following the example and noting down any happy position or attitude that strikes them. Painted portraits, it is true, are not, as a rule, to be regarded as *chef-d'œuvres* of pose, but still a great many useful hints may be picked up at the summer exhibitions by those who keep their eyes open.

The Latest Invention.—It is not often that we have to announce great discoveries in photography, but for that very reason it behoves us to make much of any novel invention which bids fair to revolutionise the whole art, and render the taking of perfect photographic portraits mere child's play in the future. Such men as Sir John Herschel, Scott, Archer, Poitevin, and Swan may have done something in their time to render the art more practical, easy, and permanent; but Dr. Buzzard's invention is, after all, the most marvellous. What is it then, our readers will ask, which engrosses so much of our attention? We will answer in the words of the *Lancet*, since we would be the last to deprive any contemporary of the priority of publication of so important a novelty. Dr. Buzzard, it seems, has frequently felt bored when sitting for his portrait; the strain has been so great that he has devoted much time and labour in the hope of finding out how this could be relieved. To those who can wait, we are assured, all will come in time. And so it has been with Dr. Buzzard. He has waited, and in the end triumphed. Henceforth his name will be linked to that of Niépce, Daguerre, and Talbot, and posterity will have yet another to thank for giving them the improved art of photography. But we must be brief, and will set down, therefore, without further preamble, the plain unvarnished (not in a photographic sense) word of Dr. Buzzard from the *Lancet*, showing how easily the object that gentleman had in view was accomplished:—"Having begged a piece of paper, and drawn upon it a circle of about four inches diameter, I converted this into a sort of clock face by adding the usual Roman figures in their accustomed places. The paper was nailed to a post about eight feet distant, and when the sitting began I first fixed my eyes upon the figure xii, then upon i, ii, iii, and so on 'all round the clock,' the gaze shifting leisurely from one figure to another. As I had anticipated, the sitting ended without any sense of pain, mist, or giddiness having been felt." The effect is said to be clearly marked in the pictures, which are far more satisfactory, we suppose, than when any of the other hundred and one means taken by photographers to call off the sitter's attention are used. For the benefit of our readers, we may add that, so far as we know, no patent or provisional specification has been taken out for what has been termed "a novelty in the photographic art," and therefore anybody is at liberty to use the invention without cost. The size of the disk—four inches—must, however, we believe, be strictly attended to, and the post must stand exactly eight feet distant. That Mr. Clement Scott and Mr. Sala, the respective authors of "Here stands a post," "and Twice round the clock," will consider their copyrights in peril by this suggestion, we do not believe for one moment; but still it would be well, perhaps, to follow Mr. Buzzard's advice, and only to go once round the clock, and not approach the post nearer than eight feet. So far as we are concerned, we can only say, with a once noted reviewer, that the name of the inventor will be remembered when those of Niepce and Fox Talbot are forgotten—but not till then.

The French Exhibition.—Great Britain is supporting the French International Exhibition with a will. The Prince of Wales's visit has lasted some weeks, and other members of the English aristocracy have been with his Royal Highness during the inauguration of the exhibition. Both Mr. England and Mr. Warnerke have visited the building, and expressed themselves satisfied with the show of British photographs on the walls. Our Paris Correspondent, M. Ernest Lacan, also gives our countrymen a good character, and there can be little doubt that the Paris International Exhibition of 1878 will cement the friendship which has so long existed between the two countries. Owing to the tardiness of some of the exhibitors, the Paris Commissioner has threatened to forfeit the space of all those whose objects are not in their places by the 15th inst.

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ON THE CALOTYPE PROCESS.

BY COL. BIGGS, R.A.*

The calotype process of taking negative photographs on paper has become quite obsolete, and a thing of the past;

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* Read before the Bristol and West of England Amateur Photographic Association.

but it is a question whether its being so readily abandoned for the collodion process was not a great mistake. A very considerable experience in both processes in this country and in India warrants my giving a decided opinion that the paper process has some advantages over the collodion for a certain set of subjects.

The superiority of the collodion process for portraiture and for stereoscopic and microscopic subjects is unquestionable, but for landscapes of a large size, for foliage, for architecture where the carving or tracing is not very minute, and particularly for copying sculpture and inscriptions, I consider the paper process capable of giving all that can be desired. The definition, though not quite equal to that on glass, is sharp enough, and the absence of extreme sharpness in many subjects is desirable in an artistic point of view.

It has been urged that paper will not give objects at a distance with any distinctness, but my experience goes to prove that distant objects are, as a rule, rendered better on paper than on glass, from their not being liable to obscurity through solarization so much as is the case with collodion negatives. I have paper negatives, taken in India twenty years ago, giving objects very clearly at distances from four to twenty miles, so that this objection is groundless. To show that prints from paper negatives are not very far below those from collodion, I may mention that on my return from India in 1863, I sent a number of prints from paper negatives to an exhibition in London, where they were mistaken for prints from collodion plates, and pronounced very beautiful, but not quite equal to the ordinary collodion pictures. When it was represented that the prints were from paper a prize was awarded. Moreover, a collection of prints from my paper negatives sent by Government to the Paris exhibition gained a medal.

The rage for portraiture, the little appreciation shown for landscape photography, and the collodion process presenting fewer difficulties, I believe, constitute the principal reasons for the paper process having been so soon abandoned for the collodion process. With the latter, the iodized surface was obtained ready prepared, and was easily applied; whereas good paper was difficult to be obtained, and when obtained the process of iodizing the surface was one of great nicety, neatness, and delicacy of manipulation.

The one great drawback to the paper process is the long exposure required; but even this has its advantages in allowing more detail in the shadows to be brought out than can be done with short exposure. In this country and on the western coast of India the average exposure with a four-inch landscape lens was three minutes; but away from the coast of India, in hot and sandy districts where the radiation from the ground was great, the thermometer varying from 80° to 85° between nine and ten a.m., the exposure was as high as twenty minutes. Against this, however, the portability, freedom from risk of breakage, scratches, &c., are advantages which are of great weight, particularly with negatives of a large size. I found what was called the waxed-paper process—viz., waxing the paper before iodising—a decided failure. The negatives produced were always woolly and indistinct—the result, I think, of the texture of the paper having been disturbed by the removal of the size and the application of the wax. I have never seen any really good negatives produced by the process. The process I found to answer best was the following, which I got from Mr. Buckle, of Leamington, from whom I had one hour's instruction, and I have never seen any photographs superior to those taken by Mr. Buckle:—

Having procured suitable paper—in which the size should be hard, the surface smooth, the texture close and even, and the body free from metallic particles—I cut it up into pieces fitting exactly the negative frames, marking the smooth side of each in one corner with a cross in pencil. I had several boards made of deal one inch larger every way than the negative paper, the front of each board covered with fine flannel over a thin coating of cotton wadding, and at the back a loop of broad elastic large enough to admit the hand to hold and manipulate the board easily. Over the flannel I laid a sheet of clean, white blotting-paper the size of the board, and then pinned a piece of paper, to be prepared, on the blotting-paper, to the flannel with silver pins made for the purpose, and one and a-half inch long, the pins lying almost flat on the board. Then with a Buckle's brush (which consists of a glass tube four inches long and half-an-inch in diameter, and a silver wire hook which draws a tuft of clean cotton wool partially into the tube, leaving a ball of wool outside, which with a little care can be made into a perfect shape by pulling the superfluous cotton away) I applied the following solution to the surface of the paper evenly and gently, without disturbing the surface of the paper, but working it over several times lengthways and crossways, namely—

Nitrate of silver	33 grains
Distilled water	1 ounce

This sheet was then left on a table or flat surface while a second piece was similarly treated. The pins were then removed from No. 1, and the paper taken up by two corners and placed on a table covered with a clean sheet of blotting-paper, face uppermost. Then No. 3 was prepared, and the pins removed from No. 2, &c., and No. 4 prepared. When six or eight had been thus treated, No. 1 would have become surface dry, or like a newspaper just out of the press, and would be ready for the next process—that is, of immersing in a bath composed of—

Iodide of potassium	20 grains
Distilled water	1 ounce

turning it over and removing air-bubbles on the iodised surface and back with a soft camel's-hair brush. After a minute and a-half or two minutes the sheet would be ready to be removed into a bath of rain water, the water being changed every half-hour for three hours, and so on till the six or eight sheets were completed, and then another batch proceeded with.

After three hours the papers were removed carefully (being very tender) and thrown over a piece of broad tape suspended across the room, and covered with strips of white blotting-paper, the papers being face upwards on the blotting-paper, and placed cornerwise so as to drip from two corners. When dry they were taken down and pressed flat, care being taken not to finger the surface, and, if kept in a dry place, they would keep good for an indefinite time.

When required for use the iodized surface was rendered sensitive thus:—The paper was pinned, as before, on to the board over blotting-paper, and parts of the following solutions A and B applied to the iodized surface with the Buckle's brush plentifully, evenly, and quickly in the dark:—

Solution A.

Nitrate of silver	50 grains
Distilled water	1 ounce
Glacial acetic acid	10 drops

Solution B.

Saturated solution of gallic acid.

Take of solution

A	6 drops
B	6 „
Distilled water	120 „

(In very warm weather, 180 drops of water).

After exciting one piece, the pins were removed from the corners, and the board, with the paper still on it, allowed to remain on a flat surface while a second piece was excited. Then all the superfluous liquid was blotted off the first piece with a piece of clean, white blotting-paper, and the sheet placed in the negative frame. The second piece was then blotted off, and placed also in the frame, and the frame screwed up tightly. The double frames used were not hinged, but the inner surface of one-half grooved, the other carrying a corresponding projecting ridge, and fastening together with four screws. The glasses were not cemented as usual, but lying on beds of sheet india-rubber. There was thus no fear of breaking the glasses in screwing the frames together, and the paper were kept flat and air-tight. Paper excited at nine or ten o'clock at night was generally exposed and developed before twelve o'clock the next day.

The development was as follows :—The negative was pinned on the board over clean blotting-paper, and equal quantities of solutions A and B were applied with a clean Buckle's brush quickly and evenly over the surface, which was kept till wetted in every part. When the detail of the picture was well out, but wanting depth, some of solution B alone was poured on to the picture, and quickly distributed all over the surface with the brush, and the same was repeated until no more would develop. Then the negative was removed and plunged *quickly* (or stains were likely to appear) into clean rain water, and left in till it was convenient to fix it, and remove the iodide of silver in a bath of strong hyposulphite of soda, the negative being kept in this bath till all yellow colour was quite removed. It was then placed in rain water, and well washed for several hours. After this it was placed in a bath of hot water, as hot as the hand could be, for half an hour, to remove the size, and render it capable of taking the wax properly. It was then hung up to dry.

When dry the negative was placed, face downwards, on several thicknesses of white blotting-paper, and a hot box iron run over the back. The iron was held in the left hand, and its course followed by a cake of pure white wax held in the right hand, and the wax rubbed on to the negative, which was hot enough to melt the wax. When the wax had been applied as far as required, the negative was turned over, and the iron run quickly over the face to draw the wax through the paper. The negative was then placed between two pieces of blotting-paper, and all superfluous wax taken off by passing the iron over the blotting-paper. The negative was thus finished, and ready for printing from.

THE PRACTICAL WORKING OF THE COLLODIO-BROMIDE EMULSION PROCESS.

BY ALEXANDER MATHISON.*

I have been asked to give—not certainly a paper on the collodio-bromide emulsion process, but to show my mode of working it. I do so with the greatest reluctance, as the subject has been discussed so often that anything I can say will be just a repetition of what has been said before. It has now been before the photographic world for nearly fourteen years, and during that time has been brought out in many different forms. I refrain from touching on these, as it is sometimes in connection with photographic processes no easy matter to give honour to whom honour is due.

It is now two years since my friend, Mr. Aird, gave me the formula which I at present work. At that time nobody here thought of working anything but Mr. W. H. Davies's beer and albumen process, with which fine work was done; and when I discovered that I had to make the collodion and, what appeared worse, to test the emulsion, I believe I would never have tried to get over it had not Mr. Aird showed me the whole process.

Well, with his assistance, I am just going to do the same thing here; and from the many enquiries which have been made since I showed the work I had done last season, I know that a few more of my amateur friends, when they see the simplicity of making the plates, the beauty of development, and the certainty of results, will give it a trial. A process which has these advantages has certainly a great deal to recommend it, especially when you read a confession like that of Mr. H. Cooper, who says that with washed emulsions he has, after hundreds of experiments, never been able to depend on plates that have been prepared for more than a few days. Now with this you can keep the plates for a year, at all events, and, contrary to the opinion of many, this emulsion will, if properly prepared, keep good for many months. A friend of mine used some that had been kept for a year, and could see no difference in the results from the plates he made and used when the emulsion was new. Now I think this is an advantage that will amply recompense you for the little extra trouble in preparing it.

Professional photographers will, I also hope, be induced to turn their attention to it; for, with a few plates prepared at some time when other business is quiet, they would be ready to do any outdoor work that was wanted—a thing which many of them at present decline to undertake on account of the trouble in taking all the paraphernalia requisite for the usual wet process. I further think the process would be well suited for enlargements. Transparencies, both by contact and in the camera, can be very easily produced by it, and if you have got a good transparency I think any one could with little expense have the means of doing enlargements up to (say) 24 by 18 inches.

I may say I have found these plates no more sensitive in their wet state than when used dry; and lately, when trying them wet, I could not by any possibility keep the film on the plate, but when allowed to dry they would stand any amount of washing.

I will now give you a practical illustration, and will begin with the collodion, a stock of which should be kept on hand, as it improves greatly with age, and it is just as easy to make a large as a small quantity. Our manufacture in the present case, however, will be on a small scale—for the sake of convenience say two ounces. For this quantity I will take four drachms of alcohol. We will now have to weigh our bromides; but, unfortunately, the cadmium salt generally sold is not anhydrous, and we therefore take a small quantity into this small evaporating basin and apply heat, which will soon drive off the moisture. Take twelve grains of this and six grains of bromide of ammonium; mix them together, which seems to make them more easily dissolved. Add this to the alcohol, and then put in twelve grains of pyroxyline, which does not require to be any special kind. This will readily dissolve. Then add twelve drachms of ether, and this is your collodion.

We will now emulsify it; and for the two ounces take twenty-four grains of nitrate of silver, put it into a test-tube, dissolve in the smallest quantity of water with the aid of heat, and then add four drachms of alcohol. Boil over a spirit lamp; then add this to (say) one and a-half ounce of your collodion, shake well, and in a few minutes add the other half ounce of collodion. This method of emulsifying seems to give a more sensitive film and finer deposit than if you had added the silver to the full quantity of collodion.

Now for the testing, which frightens so many. Could not some of you give the experiment a better name? I think if it were just said "we will see if the emulsion is right," it would be better. Take a little of it in a measure glass, run it round the glass till a thick film forms, then add a little distilled water; break the film well up, and decant a small quantity into two test-tubes. To one add two or three drops of a twenty-grain solution of silver; to the other add the same quantity of bromide of potassium. Should either of them be the least milky there is an excess of the opposite material to that with which it was tested; that is, if the tube be milky to which the silver was added, there would be excess of bromide, for which the remedy is to add a little more silver. If the tube to which the bromide was added be milky, then you have excess of silver, and require to add a little more collodion. Should the tubes remain clear then you may consider you have your emulsion in its most sensitive state. It should now stand for twenty-four hours at least, during which time you can give the bottle an occasional shaking. Filter through linen, and you are now ready for preparing a batch of plates.

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* Read before the Edinburgh Photographic Society.

Keep always a supply of clean plates in your box. I prepare mine by soaking them in very dilute sulphuric acid. If they have been varnished, put them in a solution of warm water and washing soda, which will soon take the film off; then rinse in cold water, and put them into the acid. When wanted, I take them into the washing-house, put the plate on the bottom of a tub, give it a good scrub with a hard brush, rinse with water, drip, and then flow it over with albumen. When dry, they are ready for use.

You can now coat the plate with the emulsion. This must be done slowly, as, if you tilt the plate suddenly, the same as you might do with wet collodion, there would be a mark at the top of the plate. Allow it to set well; then plunge it into a dish of water. Take as large a vessel as you can get, and you can then go on coating the plates till your vessel is full; but they should remain in this till greasiness disappears. Take your first coated plate out, drain, and flow over with preservative. Almost any of the usual preservatives will do, but I use bitter beer. It needs no alcohol to moisten the plate before development, and works nice and clean without any restrainer in the developer. You have only to flow it over once or twice, and put it aside to dry.

Like most dry plates these require a backing of some colouring matter to prevent blurring—say, a little burnt sienna, to which has been added a little gum to make it adhere, as also a small quantity of alcohol, which allows it to dry quickly, as well as helps it to keep.

The plate is now ready for exposure; and, although these are, perhaps, not the most sensitive plates you can get, yet my impression is, that as you increase the rapidity you also increase the uncertainty. I have two plates with me to develop that were exposed yesterday with Dallmeyer's 8½ by 6½ rapid rectilinear, ^{1}stop $_{18}$ focal length, for one and a quarter minute, and I am quite sure they will be fully exposed.

The development of these plates is, you will see, so simple and beautiful that I do not think any of you will envy those who go in for some of the new processes, where they have almost to work in darkness, and turn up the back of their plates with the expectation of seeing a "ghost." In most cases you only require two solutions in developing—one a saturated solution of carbonate of ammonia, and the other a sixty-grain solution of pyro in alcohol.

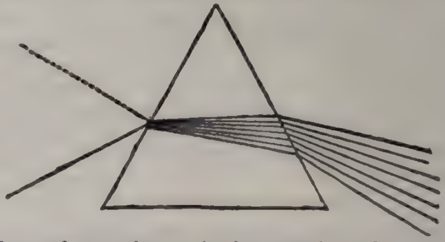
I will now try and develop this plate. First wipe off the backing with a wet sponge; moisten the film water, or rather wash it till all greasiness disappears. Now take a quantity of the ammonia solution, to which add a few drops from the pyro bottle; and then flow it with a good sweep over the plate. The image will soon appear, and will rapidly gain in intensity as well as in detail. If the plate be properly exposed it will require nothing further; but should all detail come out without sufficient density, owing to the plate being over-exposed, you had better wash and apply the usual acid pyro and silver intensifier, not forgetting to swill the plate with weak acetic acid, to neutralize the ammonia that may be left in the plate, before applying the intensifier. You can fix with hypo or cyanide, but I prefer hypo.

THE COLOURS OF THE SPECTRUM IN THEIR RELATION TO PHOTOGRAPHY.

BY ERNEST DUBY.*

THE formation of the prismatic colours, as they are generally called, will be well known to the majority of my readers; I need therefore say only a few words on this subject. A ray of light in passing obliquely from a layer of one transparent substance into that of another is bent out of its path; from a rarer into a denser medium it is bent towards the normal at the point where it enters, and from a denser into a rarer medium away from the normal. This can be demonstrated by a very pretty experiment:—Fasten a coin with a bit of wax to the bottom of a basin, and then step backwards until the coin has just disappeared from sight behind the edge of the basin. Now pour water on the coin without moving from the spot where you are standing at the time, and instantly the coin will again become visible, looking as if it and the bottom of the basin in which it is lying had both together been raised several inches. The cause of this phenomenon is found in the refraction of the light ray, by means of which we are really enabled to perform that difficult feat of seeing round a corner. The reason why the coin seems to be higher than it was is due to the preconceived idea formed, unknown to ourselves, that the visual ray is straight throughout its whole length. A ray of light undergoes similar refraction in passing through glass, bisulphide of carbon, diamond, &c., a refraction which is amenable to exact fixed laws.

When, however, we examine the appearances presented by a ray of light that has passed through a prism (a piece of glass cut so as to have three plane sides), we shall see that, besides the bending or refraction of the ray, it will present the phenomenon of scattering or dispersion; that is to say, the light on leaving the prism is no longer the ordinary white light, but consists of a number of variously coloured rays. Among the colours thus shown, there are seven which can be more especially recognized—red, orange, yellow, green, blue, indigo, violet. The figure below shows the dispersion of white light by passing through a glass prism. At its entering the prism the light undergoes dispersion, and this dispersion is still further increased on its leaving the prism. The least refrangible rays are the red ones; the violet rays are bent the farthest out of the path. With a flint glass prism having a refracting angle of 60°, the total dispersion on the rays issuing from the prism will amount to nearly 5°.



A memoir which appeared last year in the *Naturforscher*, and which we will here transcribe, may serve as a starting-point for the further remarks that we shall have to offer.

For more than a hundred years the chemical action of light has been studied by the most able philosophers, and the recorded facts and results are exceedingly numerous. For a long time these researches were directed to subjects of practical interest, such as photography, or, at least, were materially influenced by them; it is only of late years that the subject has been handled from a scientific point of view, particularly as regards the action of the separate rays on different bodies. It was discovered that generally light has a reducing action on salts, while on organic bodies it either produces no effect, or acts as an oxydising agent. It was found that more particularly the violet and ultra-violet rays manifest this action of light, and on this account they were specially called the chemical rays. The experiments undertaken during the last few years, however, go to prove that the less refrangible rays, even to the red end of the spectrum, exert a chemical effect, especially on mixtures of organic compound with salts. On the nature of this action of the different rays, more particularly to what extent the less refrangible rays take a part in the various chemical reactions, we have as yet no confirmed evidence from which some general definite laws might be enunciated. A material step in this direction has been made by M. P. Chastaing, by means of a thorough investigation which he has published in the *Annales de Chemie et de Physique*, and of which we give below an abstract.

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* Continued from page 190.

It is self-evident that in studying the nature of the action of light on various substances, we should direct our attention in the first place to those that are light absorbers. Inasmuch as the absorption depends on the colour of the substance, it will be seen also that only certain rays can be investigated with different coloured bodies. In the following experiments, therefore, only four groups of rays were distinguished—the violet, the green, the yellow, and the red; and, in order to commence with the simplest cases, the metallic bodies are in the first case experimented on. Accurate measurements, however, of the photo-chemical effects proved to be impracticable, inasmuch as even at a constant temperature, the action was not in proportion to the time; relative measurements alone, therefore, could be carried out. Attempts to measure the chemical influence of the sun have, as is well known, not yet been very successful. To test the effect of different coloured light, either the spectrum or stained glasses were employed. The colours of the spectrum were only used in cases where the chemical action of light was rapid; where the reactions required an exposure of weeks or even months, recourse was had to coloured glasses, whose power of absorption had in each instance been determined by spectral analysis.

When white light is allowed to act on a binary compound, reduction will nearly always occur after a shorter or longer interval. Only in rare cases is oxydation found to take place, so that, speaking generally, we may say the action of light is a reducing one. Instances of oxydation can be referred, as will be shown further on, to a secondary chemical action.

The violet and ultra-violet rays have a reducing effect on salts or binary compounds. Compared with that of white light, however, this operation of violet light is much more rapid: it will produce the same effect in a much shorter time. The action of the green rays appears to be much less defined. After a time reduction will be observed; but it must be noticed that neither with the colours of the spectrum, nor with stained glass, can *pure* green rays be submitted to the test. If yellow rays be made to act on salts, no result will usually be obtained. These are known as rays of continuity: they destroy the effect of the violet rays. M. Chastaing has also succeeded in showing that the yellow rays have a special action which is opposed to those of the violet rays. The same results are obtained with the red rays, though their efficacy is more definite. To establish this theory, that the red and yellow rays have an oxidizing action on salts and binary compounds, M. Chastaing produces a series of proofs. His indirect evidence he deduces from the fact that these rays prevent the reducing action of the violet rays, which can only be caused by their oxidizing power; and further, from the circumstance that white light—in which, besides the violet, red rays also are operative—is much less rapid in its action than violet light alone. In addition, he adduces, as direct proofs of the oxidizing power of the red and yellow rays, the results of experiments with easily oxidizable and reduceable bodies—such as manganous oxide, ferrous oxide, ferrous sulphate, potassic ferri-cyanide, metallic arsenic, arsenious acid, hydric sulphide, sodic sulphide, and potassic sulphide. In these experiments, which were all made at the same temperature, the chemical action in the dark was compared with that under the influence of the violet, green, and red rays, and then either the amount of the oxygen absorbed by the salts was directly measured, or, where possible, the substances formed by the reactions were determined by volumetric analysis.

(To be continued.)

A PHYSIOLOGICAL HINT TO PHOTOGRAPHERS.

BY THOMAS BUZZARD, M.D.*

Discomfort, amounting in many persons to actual distress, is experienced in sitting for a photographic portrait. The eye is fixed on a certain spot, and whilst staring at this, vision becomes indistinct, surrounding objects especially being lost in a thickening mist. A feeling of giddiness, and even of faintness, is apt to follow if the sitting is at all prolonged. Whilst undergoing an ordeal of this kind a few days ago, in Mr. Fradelle's studio, the idea came across me that this strain was unnecessary, and could be avoided by a simple contrivance. Having begged a piece of paper, and drawn upon it a circle of about four inches diameter, I converted this into a sort of clock face by adding the usual Roman figures in their accustomed places. The paper was then nailed to a post about eight feet distant, and, when the sitting began, I first fixed my eyes upon the figure XII, then upon I, II, III, and so on, "all round the clock," the gaze shifting leisurely from one figure to another. As I had anticipated, the sitting ended without any sense of strain, mist, or giddiness having been felt; and in place of the eager longing for release usually experienced, it seemed to me that I could have sat on without effort.

As Helmholtz clearly puts it, "to *look* at anything means to place the eye in such a position that the image of the object falls on the small region of perfectly clear vision. This we may call *direct* vision, applying the term *indirect* to that exercised with the lateral parts of the retina—indeed, with all except the yellow spot." The mistiness which occurs when the gaze is long fixed in one direction appears to come up from the periphery of the field of vision. This means, probably, that the fatigue of the nervous element is shown first in those portions of the retina which are least highly developed, and where vision is indirect. These parts, in the ordinary method of procedure, are subjected to a constant strain for a period which frequently amounts to sixty or seventy seconds. By the plan which I adopted, each movement of the eye which brought a new clock figure upon the yellow spot necessarily shifted also the position of all surrounding objects in relation to the rest of the retina, fresh points of the nervous layer being thus presented to the action of luminous rays every three or four seconds. Hence fatigue of the nervous element never had time to occur. On the other hand, the rotatory movement of the eyeball in adapting itself, step by step, to the figures upon so small circle at such a distance was so excessively fine as to cause no interference with the photographic process. Mr. Fradelle, who has since applied the suggestion in many other cases, writes me that "the eyes are excellently well defined, even to the iris; not alone yours, but all the pictures I have taken since have a marked superiority over those I had previously taken in the manner in which the details of the eyes are reproduced. In my opinion, the success of your idea is unqualified. I have questioned my sitters after the operation, and they express themselves as not having had any strain upon their eyes.'

It is evident that the plan described is likely, incidentally, to prevent to a great extent the staring expression which the face assumes when the gaze is long fixed upon an object, for it combines a certain amount of free play of the eyes with accuracy of photographic definition. A somewhat larger circle, I have no doubt, may be employed with even greater advantage; and printed words, pictures, or other objects, may replace the figures. For children, and others who do not easily follow directions, a disc with a single aperture towards its edge might be made to revolve, in the direction of the hands of a clock, before another disc prepared with pictured objects of some kind or other, so that one would appear at a time at short intervals of space, and attract the eye. Various other modifications, indeed, at once suggest themselves as feasible, so long always as the figure towards which the gaze is directed presents a *succession* of objects arranged in a circular form.

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* *Lancet.*

The Photographic News.

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DRY PROCESSES, PAST AND PRESENT.

The offer of Mr. Paget's prize for a dry-plate process fulfilling certain simple but desirable conditions has given a renewed interest to dry-plate photographers generally. Not, indeed, that the interest in such a subject can ever be said to have flagged; but of late years interest has been chiefly directed to emulsion processes, whilst Mr. Paget's offer seems to direct attention to a review of dry processes generally. Such a review cannot fail to be interesting and instructive, and it is probable that a trial of old processes with the modifications which recent experience may suggest may be found a profitable undertaking. The application of recent experience in developing alone might prove of signal value to many old processes. In the oldest processes acid pyro, with a few drops of nitrate of silver solution, was applied at once to the plate. Then came Mr. Mudd's modification, in which plain pyrogallic solution was applied until the image was brought out, intensification being effected by adding citric acid and silver to the plain pyro. This was an enormous improvement, and reduced exposure in a marvellous degree, whilst it gave at the same time more harmonious negatives. The application of alkaline development was one of the greatest steps in dry-plate work, although so little promising when it was first announced. When we received the details of its first discovery from Mr. Leaky, of Dublin, who had developed negatives by ammonia alone, we hesitated to publish the statement without verification. As matters now stand, some of the most valuable processes could not exist without this mode of development in the form to which it has been brought by experience in the hands of skilful workers.

Mr. England's résumé of personal experience with many dry processes, given before the Photographic Society on Tuesday evening, although all too brief, was very interesting. Mr. England has tried many dry processes, and attained a considerable amount of success with all, having obtained a medal for the best dry plate work at the recent exhibition held by the Society. Mr. England commenced his dry-plate experiences with a very simple and fascinating process, the resin process of the Abbé Desprats. In this process a very small portion of powdered resin was added to the collodion, which was sensitized, washed, and dried, without other treatment. After exposure it was moistened, immersed in a silver bath, and developed with pyrogallic acid in the same manner as a wet plate. The exposure was not much longer than that required for a wet plate, but the silver bath gradually became contaminated by immersion of the resinized collodion, and the plates did not keep. Two or three days, if we remember rightly, was the time of keeping claimed by the Abbé. The much-vaunted and ever-disappointing tannin process was next tried by Mr. England, but the tendency in the plates to solarize and to give hard negatives condemned the process. The original Taupenot was next tried, but the operations were too complex and tedious to satisfy the necessities of a professional photographer, and Mr. England adopted a modification, to which he adhered for some time with success. This modification was more nearly allied to the Fothergill process than to the Taupenot proper. It consisted in applying dilute albumen to a sensitized and washed plate, washing, pouring on a solution of nitrate of silver, again washing, and drying. The great drawback to the original Taupenot, or collodio-albumen process, was the complexity of the operations. In this process the sensitized collodion plate was washed, coated with iodized albumen, and dried. In this state it might be kept a long time. When required for use it was again sensitized, washed, and dried; and was then ready for exposure. It was one of the most certain and trustworthy processes, yielding excellent results. Mr. Mudd, who was at one time *facile princeps* in dry plate work, used to produce pictures with this process not inferior to those obtained by the wet process. On the keeping qualities of the plates he has made some excellent remarks. He says:—"The length of time they will remain good depends on the weather. When cool they will keep a month, but in sultry seasons, when milk turns sour, and meat goes bad, they deteriorate soon, and for the same reasons. Then a week, or ten days at most, is as much as they should be trusted." The question of temperature is an important factor in the keeping of dry plates, which has, we fear, been too much overlooked in the consideration of the forthcoming dry plate competition. As regards keeping after exposure, Mr. Mudd's testimony is satisfactory. He says:—"The image, after exposure, does not gradually disappear as in some dry processes." This was notably the case in the tannin process. But a collodion-albumen plate, Mr. Mudd found, suffered no deterioration in a reasonable time: "The first plates exposed on a tour, would," he adds, "be as good as those used just before returning home." This is an important fact to remember, for those endeavouring to satisfy the Paget conditions.

The gum-gallic process of Mr. R. Manners Gordon was next tried by Mr. England, and he speaks in high terms of its results, save that it failed to satisfy him in keeping qualities.

Captain Abney's beer process, with a modification, is the latest favourite, and with it he won the recent medal. The modification was due to an accident, details of which will be found in Mr. England's paper, which we hope to publish in our next. The process, as he now works it, closely resembles, in many respects, the gum-gallic process. A good commercial bromo-iodized collodion is used, to which, however, an extra proportion of bromide is added, the amount being two grains of bromide of cadmium to each ounce of collodion. A strong silver bath, and long immersion, naturally follow. The plate is then thoroughly washed, and a preservative of beer, containing one grain of pyrogallic acid per ounce, is applied. Thus far the process is Captain Abney's. Mr. England's modification consists in the further application of a one-grain solution of pyrogallic acid, washing, and drying. The extra application of pyrogallic acid makes the plate more sensitive, giving finer and more delicate detail with shorter exposure. The weakness in processes of this kind is found in the fact that beer is an uncertain compound. Even if it consist of an unsophisticated preparation of malt and hops, the proportion of these substances, themselves of varying quality, is uncertain; whilst the possibility of salt, grains of paradise, and other qualifying additions, cannot, with absolute certainty, be determined.

Mr. England has tried emulsion work, but insufficiently at present to enable him to offer a definite opinion as to its merits. On this subject there is, however, ample testimony. Mr. England avoided, as a rule, any comparison of the results of dry plates with wet plates as regards sensitiveness. He tells us that the latest favourite gave good results with an exposure little exceeding that of a wet plate. But this degree of sensitiveness pales its ineffectual fires before that of some of the dry plates which are recent candidates for photographic suffrage. We recently referred to Mr. Swan's new dry plates, which, it is alleged, are four times more rapid than wet. And we are assured by Mr. Wratten, of whose modesty in statement and trustworthiness we feel assured, that his sensitive London plates require an exposure of one-third of the time required by wet plates. If plates can be kept in stock ready for use at a moment's notice, which far exceed wet plates in sensitiveness, it appears to us that, even in the portrait studio, the days of wet plate photography are numbered.

The final sentences in Mr. England's paper were worthy of the most careful consideration of all would-be dry plate workers. He urges the utmost precision in selecting pure materials, and especially in careful and cleanly working, as success in the working of dry processes requires greater nicety and care than is demanded by the wet process.

FIXING THE EYES DURING SITTING FOR A PORTRAIT.

A communication to the *Lancet* by Dr. Buzzard calls attention to the distress felt by many persons consequent upon fixing the eyes upon one spot whilst sitting for a photographic portrait, a discomfort for which he proposes a remedy. It is to be feared that the evil is only too common, if not universal. The common locution of the old Cockney producer of shilling glass positives, "Keep your heyes on the object, sit still, and look pleasant!" is no longer common; but still the stern injunction to sit still, to fix the eyes on some small object, and to look pleasant, is made in some form or other, and too often issues in a sense of giddiness, and eyes full of water in the sitter, and staring eyes, often blurred, and a look of pain in the portrait. Dr. Buzzard points out that the distress arises from fixing the eye on one point, which is really unnecessary to secure perfect definition in the eye. Of course, if the eye move through any wide space, the point of light necessary in the presentment of a round polished object, when properly defined, ceases to be a point, and becomes either a line, or a series of points of light clustered together. But it is pointed out by Dr. Buzzard that if a round disc be provided, about four inches in diameter, and this be converted into the semblance of a clock face by placing round the margin the Roman numerals from I. to XII., the eyes may range round these figures without producing any blurred definition, whilst the facility thus afforded will altogether relieve the eye of the painful strain to which it is usually subjected. The contrivance is simple, and may easily be applied. Possibly the interest of the object might be increased if a cheap clockwork contrivance were arranged to move an index or pointer round the dial, moving over one interval of the divided spaces in a second, and thus completing a revolution in twelve seconds. If it moved much slower than this it would not help much to steady the attention. If any portraitist chose to elaborate the arrangement the rate of movement might be adjusted in each case so as to secure a complete revolution in the estimated number of seconds required for sitting. The nervous and sensitive sitter would be greatly sustained and comforted by the contemplation of the rapidly diminishing space to be travelled by the hand on the dial.

The use of some pleasant or interesting object upon which the eyes may rest has of late years, however, become common amongst many successful portraitists. Mr. Sarony, of New York, who is well known as one of the most artistic portraitists associated with photography, produces, if the sitter be a gentleman, a cabinet portrait of the most beautiful girl he possesses, and requests the sitter to "look at that" for a few seconds. As a rule, there is no need to add, "and do not move the eyes!" If the sitter be a lady, a male head—a noble, manly head—is substituted, and is equally successful, generally, in securing attention. Many sitters are apt to curiously misconceive the meaning of the injunction not to move the eyes. They understand it as meaning that they may not wink—that, in fact, they may not move the eyelids. Nothing could be more erroneous, or more mischievously erroneous. The softened, broadened, and deepened line, indicating the eyelash in the miniature portrait, produced by the free movement of the eyelid and eyelashes are a marvellous improvement to the portrait, adding much at once to softness and force of expression, and destroying the stony, blank effect of the eye when kept free from a wink. It is scarcely necessary to say that everything which conduces to the discomfort of the sitter militates against success in securing either a natural or a pleasing portrait, and should be carefully guarded against. Even a slight movement is less objectionable than a hard, pained expression. The first quality of importance in a portrait is, in the estimation of judicious critics, expression; and it will be found in nine cases out of ten that a good and natural expression is more prized by sitters and their friends than the highest excellence in technical qualities.

PHOTOGRAPHING IN THE PARIS EXHIBITION.

The following regulations for the production of photographs in the Paris Exhibition have been issued from the department of the Minister of Commerce, for a copy of which we are indebted to the courtesy of Mr. P. Cunliffe Owen, Secretary of the English Commission:—

Regulations for the Employment of Photography at the Exhibition of 1878.

Article 1.

The right of taking photographs within the enclosure of the Exhibition of 1878 is not subject to any monopoly or exclusive privilege. No photographer will be admitted to operate in the Exhibition buildings if he be not in possession of an authorization signed by the Commissary-General.

Art. 2.

The photographing of exhibits and of special structures is entirely subject to the express authorization of the exhibitor or his agents (Art. 2, General Regulations).

Art. 3.

Any foreign or French photographer, if an exhibitor, can, on his written application, obtain a permit valid for a fixed period, and renewable if necessary.

Art. 4.

Every exhibitor can, on his written application, have his exhibits reproduced by any photographer he may choose.

Art. 5.

The preceding arrangements do not apply to the *Exposition des Beaux-Arts* (Fine Art Exhibition), which will be the object of special regulations.

Art. 6.

Agreeably to the engagements made with the exhibitors in the historical and ethnographical galleries of the Trocadéro, no photographic operations will be allowed in these galleries.

Art. 7.

Photographers coming under Article 3 should mention on their application for permit:—1st. The number of assistants they intend to employ. 2nd. The period during which they desire the permit. 3rd. A summary of the apparatus of which they will have to make use, as well as of the means of transport necessary for bringing in such materials. 4th. The declaration that the applicant takes entirely upon himself the responsibility of every kind which the photographing may entail. 5th. The formal engagement to obey all orders and regulations. These declarations will be specified on the permit delivered to the photographer.

Art. 8.

The application of exhibitors who may wish to have structures or objects belonging to them photographed, shall contain:—1st. The name and address of the photographer whom they have chosen. 2nd. The precise indication of the objects, the photographing of which is desired. 3rd. The day when the photographing is to be done. 4th. The applicant's obligation to assume entirely the responsibilities of every kind which the operations of the photographer might entail. 5th. The formal engagement to obey all regulations and orders. These declarations will be reproduced on the permit delivered by the Commissary-General.

Art. 9.

The applications referred to in the preceding Articles shall be addressed to the Commissary-General: direct, when they proceed from French photographers or exhibitors; through the recognised National Commission, when made by foreigners.

Art. 10.

Operators admitted to photograph are forbidden to take into the interior of the Exhibition, annexed buildings, or structures devoted to special exhibitions, either fire or inflammable or explosive substances. They must prepare outside the buildings the plates to be employed, and must not fix their laboratories on any flagged or floored passage.

Art. 11.

The photographic operations shall take place from 7 a.m. to 9 a.m. in the palace and buildings, and until 10 a.m. in the parks and gardens. The Commissary-General, however, reserves the right of granting, if expedient, permission to photograph beyond the hours thus reserved.

Art. 12.

Photographers not provided with an exhibitor's card in their name will have to pay the price of admission fixed for ordinary visitors.

Art. 13.

Photographers authorised by the Commissary-General to photograph the palace, the grounds, and general views, will be bound to deposit at the General Commission five copies of each view, which will become the property of the Government.

Art. 14.

Persons authorised to take general views of the Exhibition, and of exhibits, will be obliged to conform to all laws and regulations.

Art. 15.

The Commissary-General reserves the right of withdrawing the permit granted to a photographer who, either himself or by one of his assistants, shall have violated the present regulations or the orders of the attendants.

Art. 16.

Photographers working in the enclosure must, when required by the police or attendants in charge of the sections or classes, produce the permit granted them.

Senator, Commissioner-General,
J. B. Krantz.

Paris, May 1st, 1878.
Seen and approved:
The Minister of Agriculture and Commerce,
Teisserenc de Bort.

FORM TO ADMIT PHOTOGRAPHER WITH APPARATUS AND ASSISTANTS.

Form No. 1.

Autorisation (Permit).

M.______________________________

______________________________ photographe,

____

est autorisé à opérer dans l'enceinte de l'Exposition avec le matériel et les opérateurs ci-dessous désignés, et en se conformant à toutes les prescriptions du règlement spécial en date du 1er mai 1878.______________________

Matériel : (apparatus)
____
____
____

Personnel : (personal)
____
____
____

La présente autorisation s'applique exclusivement aux vues d'ensemble des Palais et des Parcs (general views in Palace and Park); elle est valable du ______________________

au______________________

Paris, le______________________187 .

Le Senateur, Commissaire-general.

Le photographe soussigné, autorisé à opérer dans l'enceinte de l'Exposition, déclare par la présente assumer les responsabilités de toute nature que la reproduction pourrait entraîner; il s'engage en outre à observer strictement toutes les prescriptions des règlements et ordres de service.

FORM TO ADMIT A PHOTOGRAPHER ON THE REQUEST OF AN EXHIBITOR.

Form No. 2.

Autorisation (Permit).

M.______________________________, photographe,

demeurant à______________________________,

est autorisé sur la demande de M.______________________

____

à reproduire les constructions particulières ou les objets ci-après désignés:______________________

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La présente autorisation s'applique exclusivement aux objets ci-dessus indiqués. Elle est valable du______________________

au.______________________

Le Senateur, Commissaire-general,

L'Exposant soussigné, autorisé à reproduire les objets ci-dessus désignés, déclare par la présente assumer les responsabilités de toute nature que la reproduction pourrait entrainer.

Il s'engage en outre à observer strictement toutes les prescriptions des règlements et ordres de service.

PHOTOGRAPHY AS AN ART TEACHER.

A correspondent of an American paper, the *Richmond Transcript*, thinks photography is destined to be the chief art-teacher in the States; the sooner photographers themselves learn art, therefore, the better. And it is to the credit of American photographers that they have of late years made rapid strides in that direction. The writer says:—"Few persons realize the vast amount of study, artistic taste, and judgment that has been expended upon photography to bring it, by a regular system of induction, from the dim and awkward results of the earliest productions to such artistic perfection as it has now reached. Indeed, this magic limner has attained such exactness and perfection in portraying every phase of nature, from its grandest creation to the most delicate forms of beauty, that its best effects excite within us the same sentiment of the beautiful, and all the pleasurable emotions we experience in beholding some of the finest works of art. There being no art galleries in this country, and consequently no general culture or knowledge of art principles, it seems that photography must be, for the present, the medium through which the æsthetic in our inclinations in the line of the fine arts must be gratified and cultivated. From its universal accessibility, I am induced to believe that it is doing more to elevate the public taste and appreciation of what is beautiful in art or nature, than all other influences conbined. When good and bad pictures of this character are placed in contrast, what rustic will not note the difference? Whoever marks these differences is, in some measure, already a critic. I have watched this incipient discernment grow and develop into quite a critical taste, by closely studying the grades of merit of various styles of photographs. Certainly no one of taste or discernment can visit the most prominent galleries of the country—such, for instance, as Anderson's of this city— without observing some real gems of art, requiring great skill, only acquired by long experience to produce, the sun being invoked to lend a hand in the creation, need not detract from the picture, or taste and judment of those who control his subtle rays in portraying nature's ever-varying forms."

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SIMPLE INTENSIFICATION.

BY J. H. HENNING.*

Early in the spring of last year I hit upon the idea of purchasing a view lens, and I am happy to say to-day that the investment in a No. 8 Ross Symmetrical has not only proven a success financially, but also in awakening in me a desire to hunt up and study dame Nature's beauty and grandeur, an abundance of which meets our gaze at every crook and turn, thus inducing me to fly from the general routine of in-door work at such odd hours as could be sacrificed for the benefit of body and mind, and incurring an addition to the list of registered negatives of a few which give delight and pleasure to me as often as I may come across them.

But here I am running into matters, although instrumental in leading to the results to be noted, are yet not explanatory of the heading above; therefore, to the point. As before stated, the lens was purchased, and I was inclined to make all I could out of the investment. A few negatives of popular places were made, and also a few samples of line drawings and maps in ink and colours placed on exhibition, the effects of which soon became apparent through the receipt of several good orders. But now came the difficult operation of "doing the best you can" with drawings on the common buff drawing-paper. Volume after volume of the *Photographer* and other works were subjected to careful search, and many of the processes tried, until finally I hit upon the following, which I do not recollect seeing in print before.

Make your negative as intense as possible in the first place, giving full detail to all parts; then if the general intensifier, pyro and silver, does not suffice, have ready at hand a three-grain solution of iodide of potassium, using in conjunction with the following solutions as described.

No. 1.

Pyrogallic acid	... ...	12 grains
Citric acid ...	... ...	10 ,,
Water ...	... ...	1 ounce

Take enough of this to flow your plate, which should be done once or twice before adding the solution

No. 2.

Nitrate of silver	... ...	15 grains
Water ...	... ...	5 ounces
Solution iodide of potassium	...	3 drops

The solution should be flowed evenly, and the action carefully observed. The general precaution of washing negatives thoroughly must be adhered to.

◆

Correspondence.

CHARACTER OF MASTERS AND ASSISTANTS.

Dear Sir,—Will you allow me to offer a suggestion, which, I think, might be carried out in a case to which your correspondent refers, without very much inconvenience to either employer or assistant, as I am fully aware in what way a great many assistants are served, and must say there should be some way in which to prevent the occurrence which oftens happens, since there are so many small and pettifogging photographers springing up, men whom no one knows and has never heard of before, without any, or little, knowledge of the business and good manners. I am afraid it would be rather a difficult case to apply to the last assistant, as you do not know who he is, or if he is still there, which is not often the case.

Now, I think that when you write to a place or receive an answer to advertisment from anyone of whom you have never heard, that instead of sending your own carte and specimens (which you are invariably asked to do), there should be an exchange, so that you would then be on an equal with your employer, and could see what style of work he was in the habit of doing, as well as he could see yours. You might also gain an idea what sort of person he was, and if he were a young or elderly person, from his carte. You might also enquire the price he gets for his work, so that you would then get a pretty fair knowledge of whom you were going to, as these things would influence you a great deal for or against the place.

If you did this you would have more particulars than assistants are in the habit of getting, and it might save you accepting the place and rushing blindfolded, and after getting there finding it a regular swindle, as is often the case when going to a man of whom you have not the slightest knowledge. There would also be more chance of your being satisfied with the situation if you had more particulars before you started.

I also think it only fair that, after a trial in which both parties were perfectly satisfied, there should be an agreement entered into between them for the twelve months, which is quite right for both, as it is often the case that after stopping all through the busy time and working hard for your employer, he takes the slightest advantage of you directly the slack time sets in, and on any pretence he can raise will give you a week's notice. Now this, you must acknowledge, is very unfair for the assistant, but is often done, and it is not your fault that things are rather slack in winter. This may not altogether do away with the evil, but I am quite sure it would go a long way towards it.

In conclusion, I must say there is no need of all these precautions when it is any widely known photographer, of whom there are plenty, and whose names are a sufficient guarantee that you will be fairly dealt with.

I trust that if I have not encroached too much on your valuable time and paper, that you will give this publicity, as these cases are a growing evil, and should be put down both for master and man; and then perhaps, there would be a great many more good assistants.—Yours truly,

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* *Philadelphia Photographer.*

A PHOTOGRAPHER.

[Messrs. Coam and Co., professional photographers, write that they are of opinion that employers should not object to givethe last assistant's address, thus giving a man an opportunity to form some idea of the engagement he is about to accept. A master always requires a good reference with a new employee, and why should not this rule apply, they ask, between man and master?—ED.]

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE usual monthly meeting was held in the Water-Colour Gallery, Pall Mall, on the evening of May 14th, Mr. J. GLAISHER, F.R.S., in the chair.

The minutes of a previous meeting were read and confirmed.

Before commencing the proceedings, the CHAIRMAN referred in feeling terms to the recent death of Mr. J. A. Spencer, and expressed what he was sure the meeting joined him in feeling, strong sympathy for his widow.

Mr. J. L. Montefiore and Mr. J. L. Güger were then duly elected members of the Society.

The CHAIRMAN, observing the presence of Mr. Henry White, called upon him to receive the silver medal voted to him by the Council in remembrance of many years most assiduous and valuable services as treasurer to the Society during a very trying period.

Mr. WHITE, in accepting the medal, disclaimed any right to it, but should value it most highly as long as he lived.

CAPTAIN ABNEY, F.R.S., read a paper on "Photography at the Least Refrangible End of the Spectrum," and on some photographic phenomena. Captain Abney regretted that he could not show the results, as he had intended, on the screen, as he found by the Society's terms of tenancy he could not introduce the oxy-hydrogen light into the room. He passed round, however, interesting transparencies illustrating his labours. One of these he believed showed what had never been seen by the eyes of man before,—the lines in the dark end of the spectrum beyond the red. Any mere outline or abstract of this important paper would fail in interest; we shall avoid attempting it, therefore, and hope to publish it in its integrity in our next.

No discussion arose, and after a few appreciative words by the Chairman, and a vote of thanks,

Mr. ENGLAND read a paper on "Dry Processes." A few comments on the paper will be found in a Leader, and the paper will appear, we hope, in our next.

After a brief conversation,

Mr. SEBASTIAN DAVIS read an account of his experiences with a glucose process (see our next).

Mr. WAINWRIGHT exhibited a negative taken on a gelatine emulsion plate, in six seconds, with a small stop.

The CHAIRMAN regretted that the lateness of the hour precluded an adequate discussion, but hoped opportunity would be found during the next session for reviving the subject. Next meeting would be very full, as a paper would be read by Mr. J. R. Johnson, on "Alizarine—its Nature, Properties, and Application in the Arts;" by Mr. Bolas, on "Carbon Printing;" and also a paper by Mr. Warnerke.

The Chairman then announced that the exhibition would be held, opening about October 8th, and closing on November 12th. Medals would be given, and further details would be duly announced.

The proceedings then concluded.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held in 5, St. Andrew-square, on the evening of Wednesday, the 1st instant,—Mr. MUIR in the chair.

The following gentlemen were unanimously elected members of the Society:—Messrs. W. Gibson, C. N. Byrne, John Anderson, Alex. Craig Christie, Alex. Mitchell, Robert Wallace, James S. Sutherland, John Masterton, John Ancrum, H. S. Pillans, Wm. Jenkinson, P. Canning, J. R. Cooper, J. T. Gerard, — Ross, and Henry White.

The whole evening was devoted to an interesting demonstrative lecture by Mr. Alex. Mathison, who entered fully into the most minute details of the collodio-bromide emulsion process as practised by himself, illustrating practically the manufacture of the plain collodion, the salting and sensitising of it, the testing of it when made, and so on in all its stages to the final development and finishing of the negative. From the great interest manifested and the eager attention with which every detail was followed by the large number of amateurs present, it may be anticipated that this process will receive even more attention than it has hitherto done, although for some time past it has been the established favourite of the Society. For Mr. Mathison's paper see page 231

Mr. T. PRINGLE said that all present must have been greatly benefited by the most explicit demonstration just witnessed. He had always found Mr. Mathison very anxious to give all the information in his power, and on one occasion he (Mr. Mathison) had supplied him with a batch of plates. He had found them so very simple to manipulate, and so certain in results, that he was quite enamoured with the process. While allowing that it might not be the most rapid process known, he thought there was not one process that was so certain to produce perfect results by such simple means and with such little trouble.

Mr. M. G. DOBBIE considered the Society was under a deep sense of gratitude to Mr. Mathison for the very graphic manner in which he had experimentally illustrated all the minutiæ of the process. It was another valuable communication of an intensely practical nature, enabling those present to carry away with them something tangible, to be utilised in the future daily experience of all interested in their fascinating art-science.

Mr. AIRD acknowledged the kindness with which Mr. Mathison had so courteously associated his name with the process, but he considered that gentleman was too modest in his estimation of the part he himself had played in advancing the merits of the process so persistently, as it was greatly due to his (Mr. Mathison's) personal exertions that the Edinburgh Photographic Society had so largely adopted it. He, however, thought that Mr. Mathison had scarcely done justice to its capabilities when he described it as "slow." He believed it was not only the most reliable process known, but he had practically proved it more sensitive than some of the most celebrated gelatine processes; and he considered that if the exposure of the plates developed before the Society had been very greatly reduced, equally good negatives would have resulted by somewhat prolonging the action of the developer.

Mr. W. T. BASHFORD (Corresponding Secretary) congratulated Mr. Mathison on his very successful demonstrations. He had often before borne testimony to the remarkable simplicity of the operations and the beauty of the results. He was glad to find that the process was at last taking the position it deserved. A gentleman at a distance, knowing the great interest the Society had taken in the emulsion processes, had forwarded a very fine twenty-four-inch enlarged negative, which he submitted to the criticism of the Society, and bore testimony, similar to the large negatives exhibited by Mr. Mathison, that very large plates could be coated by collodio-emulsion without any defect whatever. The emulsion used in that particular instance was Mr. Brooks' emulsion, and possessed the very remarkable property of needing no substratum or edging. His correspondent wrote as follows with regard to enlarged negatives by wet emulsion :—

"The transparency is made by contact on an emulsion plate (dry) in an ordinary printing frame, and developed with alkaline pyro. (carbonate of ammonia being the alkali used). The enlarged negative is made with ordinary apparatus. I use a room with the camera and focussing arrangement fitted to a shutter that is fitted to the window. An upright easel on castors runs the whole length of the room. This system has been described many times, and needs no further comment. The glass plate neither requires a substratum or edging with india-rubber, and there is no fear of the film slipping, as it sticks to the glass like wax. The plate is coated with collodio-bromide emulsion, and as soon as set it is placed in a large dish or tray of water. I use a wooden tank lined with zinc. The plate is allowed to remain for about a quarter of an hour; it is then moved about, and when all greasiness has disappeared it is taken out, drained, placed on the easel, and the exposure made. An emulsion used in this way requires only a short exposure. It is then developed with alkaline pyro. (carbonate of ammonia and common washing soda being used), and then fixed with hypo."

Mr J. R. CRIGHTON exhibited four very choice views taken at the recent outdoor meeting held at Rosyth Castle, the property of the Earl of Rosebery. This was the first of the season. The pictures were greatly admired for their composition and feeling, and it was remarked that in general effect they had more of the picturesque than is ordinarily obtainable.

With the usual votes of thanks the proceedings were concluded.

Photographic Section of the American Institute.

A **meeting** was held on March 5th, 1878, Mr. H. J. **Newton** in the chair.

The minutes of last meeting were read by the Secretary, and on motion approved as amended and corrected.

Dr. **Higgins** said: I have various specimens to present to the Section illustrative of emulsion photography. The photograph now shown is one which I placed upon my easel and have brought with me so that the Section can judge of the negative taken therefrom. It is a photograph of the interior of the Tribunal of Commerce, Paris, and possesses every possible variety almost of light and shade. (Exhibiting negatives from photo.) That is the photograph from which I took this negative. I made use of it by reason of its difficult character. It is a small quarter-plate negative with moderate development. I pushed that development much further than necessary to show the intensity which is obtainable in the emulsion process. I then took a large negative for the purpose of obtaining a print therefrom, which I now exhibit. I also exhibit the print obtained from the negative, so that it can be compared with the original. The development in both cases was simple alkaline development—alkaline pyro, and much weaker than ordinarily used. The President's formula for alkaline development is, I believe,

Bromide of ammonium	40 grains
Sal soda	2 ounces
Water	1 pint

The developer which I use is,

Bromide of ammonium...	80 grains
Sal soda	1 ounce
Water	1 pint

I have of late combined with that 1 drachm of honey to the pint. Such is the developer I use—twice as weak as the President's in alkaline, and twice as strong in the restraining agency of bromide; and this I almost always dilute one-half with water.

I exhibit also a second negative taken by the emulsion process, "The Marriage Ceremony," by Raphael, and the print therefrom. I am not positive whether the print was on toned or white paper.

I also exhibit a positive made by the emulsion process upon a preserved plate. The three former negatives were wet plates. This is a preserved dry plate, and the positive was obtained by contact with the negative, and placed in opposition to the gas light, an exposure of one second exactly being given. In order to facilitate the matter by counting true seconds I erected a pendulum of a proper length for the latitude of 45°, which is $993\frac{52}{100}$ millimeters, or, in English measurement, $3\frac{2016}{10000}$ feet (approximating very nearly to 40 inches), to oscillate in exactly one second. I also exhibit a second negative taken by contact—a dry preserved plate transparency with ground glass backing—held one foot from an ordinary four-foot gas burner. That is a dry emulsion plate, showing that preserved plates can be made fully equal in rapidity to bath plates. Out-door photography is another branch. I have no particular specimens to exhibit in that line, except the mere matter of showing the time of emulsion photography as compared with that of bath plate photography. The negative exhibited is on a preserved dry plate taken with a Voightlander lens of 11 inch focus: size of aperture in diaphragm, $11\frac{1}{2}$ millimeters, representing $F \div 24$. There are four different exposures on that plate each of five seconds—the third, of fifteen seconds, seems evidently to be the full exposure. The next plate was taken with a Morrison lens (which I would take occasion to most highly praise for its very valuable character of depth of focus, which it seems to possess in an extraordinary degree), 8 inch focus, taken with the third opening; size of aperture of diaphragm, 7 millimeters, representing $F \div 30$—four equal exposures on same plate, fifteen seconds for each. I have not the negative, but I have the print of an outside view taken with a similar eight inch Morrison lens in 30 seconds at 3.30 o'clock p. m.; size of aperture in diaphragm, 9 millimeters, representing $F \div 22\frac{1}{2}$. All the plates had been prepared over three weeks. I am in the habit of using dry plates that have been prepared three or four months with the same certainty. In this case I developed them immediately after exposure; but I have frequently developed them after two weeks.

The **President**: You stated you use a drachm of honey in a pint of water with your ounce of alkaline or sal soda—that is, in all these, the wet and the dry?

Dr. **Higgins**: Universally.

The **President**: What is the immediate effect of the honey?

Dr. **Higgins**: The reasons for its use are two. One, I find much greater intensity of result; the other, in cases where a long exposure is required, honey in the developer prevents it drying near as readily as without it.

The **Secretary**: It don't prevent the plate drying, does it. It may prevent it exhibiting traces of the drying on the developed image, as it otherwise might do.

Dr. **Higgins**: I am glad you corrected me, as it makes me state what I have neglected to. It is an absolute fact that in the use of the emulsion wet plate, if previous to exposure you flow that plate with your alkaline developer minus the pyro., which afterwards you put in, that you will accelerate the action of the light upon the plate from one-half to two-thirds. I have tried the experiment over and over again. Our President will corroborate, I think, my statement in so far as it relates to the accelerating influence when applied to the plate previous to exposure. I always flow my alkaline developer containing the honey over the plate before exposure in the camera; it both adds to the intensity and prevents the developer flowing unevenly over the surface. I use the same developer immediately after exposure with the pyro added.

The **Secretary**: I observe here one feature always noticeable—in making a reduced copy, as the Doctor has of this "Interior of the Tribunal of Commerce"—the shadows or the dark portions always appear darker in proportion to the reduced copy than in the large picture, from the fact that in the large picture we have very small points of light in the shaded parts, which give to the shadows transparency. When we reduce those points of light they become so small that we do not see them, and the shadows appear more dense.

Mr. **Chapman**: I think that that transparency—the one that i mounted without any varnish on it—shows a perfect freedom froms granulation, which a silver bath always has; and that was the first thing that attracted my attention in commencing with the bromide plate as being of very great importance in transparencies. In using a film composed of iodide of silver, there is always a deposit of silver on the surface; no matter how clean the work may be, it is impossible to prevent the silver precipitating on the shadows at the same time it is depositing on the high lights of the negative, and the same occurs in making a positive on an iodide of silver film. The only really good way to make transparencies is with bromide plates, and developing them with an alkaline developer; then you will have no deposits.

The **President**: Dr. Higgins, were the plates merely washed and dried, or was there a preservative or organifier put on them?

Dr. **Higgins**: The dry plates were, after being flowed, very thoroughly washed through four or five changes of water, and then organified with an ordinary organifier or preservative.

The **President**: If there is nothing further on the emulsion question, Mr. Bierstadt has some interesting experiments to relate in reference to the action of light.

Mr. **Bierstadt**: I have been trying experiments to see what colours I could photograph and what I could not. I prepared a piece of paper with the seven colours of the spectrum, as nearly as I could get them. I photographed that strip over one hundred times, and have made prints from over seventy of these negatives. I wanted to see if I could make any other colours appear white on the print, as well as we do the blue, and I wanted to see if we could make blue black. I succeeded. I succeeded in making green light, and yellow quite a light colour. I have not yet made red white. I have here a number of examples (exhibiting). I worked through blue glass—through glass of all colours that I could grind sufficiently true to allow me to bring the image of my object in focus. I had coloured glass ground until I exhausted all the bright colours I could get; then I made a cell of two thicknesses of glass and placed a rubber ring around it, and filled it with different fluids of different colours. The same colours do not always produce the same results; and different kinds of aniline dyes, different kinds of minerals, all seem to produce different results (exhibiting many prints, with number, description, and explanation on each).

I was told that I could not photograph anything through a cell of bisulphide of carbon, with iodine dissolved in it, as it cuts off all the light, and lets through all the heat. I made such a cell tented with iodine until I could not see the image on the focussing glass at all, and yet photographed it perfectly. In fact, I believe instead of cutting off, it accelerates, because among those trials there was one that required twelve minutes' exposure. It was with a cell containing aldehide green, an aniline colour; and I used a cell of this bisulphide of carbon with the cell of aldehyde green, and made an exposure in four and a-half minutes, and you here see the result.

The Secretary: Mr. Bierstadt's remarks about the characteristics of bisulphide of carbon call to mind some remarks which may be found in "Tyndall's Excursions in the Alps." The excursions were made somewhere about twenty-five years ago. In the second part of that work may be found a discussion upon the nature of light, and he speaks of some experiments upon the actinism of light passed through certain media, and he speaks of peculiar action when the light is passed through fluid containing no oxygen. Bisulphide of carbon, of course, contains, if pure, no oxygen; and he mentions that it would be interesting—but he does not say he has been through the experiment—to try several other fluids, and one particularly named by him is chloride of phosphorus. This is not a very common chemical, and one somewhat dangerous to handle; but I think if Mr. Bierstadt should continue his experiments, it might be worth while to try it.

The President: In this experiment, what was the appearance of the image on the ground glass?

Mr. Bierstadt: The green appeared lighter than the blue. If you take a deep red cell and look through it, you will make the blue end of this object sheet very black; the other end will be quite light. If you look through a blue cell it will be quite the reverse. The blue was nearly black.

The President: Mr. Chapman promulgated a theory, when Mr. Chisholm's blue glass experiments were under discussion, that the light from the object being photographed in passing through a coloured medium did not change in actinic force; the wave length of the light that comes from the object being photographed was not changed. I don't see how that can be reconciled with these experiments.

Mr. Chapman: There is nothing inconsistent with it, I am sure. He stated he made a longer exposure.

Mr. Bierstadt: It would take longer exposure if the light was passed through blue glass than without any glass. I have not found any increase of actinic force by the use of coloured media.

The meeting then adjourned.

Talk in the Studio.

Obituary.—We announce with regret the death by drowning, at St. Margaret's Hope, Orkney, of Mr. John Fraser Howie, a relative of Mr. James Howie, a well known photographer of Edinburgh.

Catalogue of Apparatus, &c.—We have received from Mr. Morley a copy of his recently issued catalogue of new and second-hand lenses and apparatus. It contains a list of a large and varied stock, which cannot fail to be interesting and useful to intending purchasers of apparatus, to whose attention we commend it.

A Photographer Tried for Bigamy.—A recent notice in our columns mentioned a charge of bigamy against a photographer. The following notice of the conclusion of the case appeared a few days ago in the daily papers:—"*Fourth Court.* Before Mr. Charley, M. P., the Common Serjeant.—Richard David Turnbull, 32, artist, was convicted of intermarrying with two women, his wife being then and still alive, and he was sentenced to twelve months' hard labour."

Transit of Venus.—From the reports of observations made of this phenomenon, it appears that the unfavourable state of the weather rendered them unfortunate in England. The state of the atmosphere was unsatisfactory also in France; but, notwithstanding, two excellent photographs, which it is said will lead to a determination of the diameter of the planet, were secured at the Meudon Observatory, where observations were taken by M. Jannsen. Satisfactory photographs of the transit were taken at the Government Observatories at Washington and West Point, U.S. At Aberdeen, where observations were made by Lord Lindsay, Mr. Ranyard, Dr. Copeland, Mr. Carpenter, and Herr Lohse, the transit was photographed by Mr. Davis.

To Correspondents.

G. J. B. asks for information on the best mode of copying. The question is a very wide, and also an indefinite one. It is impossible to describe processes fully in this column, and we do not know how much our correspondent knows, or what experience he has had to begin with. There are various methods of going about copying, scores of articles upon which have appeared in our columns. With regard to Daguerreotypes, to which he especially refers, it is first necessary to take the plate from under the glass, dust it carefully with a soft camel's hair brush, and, if necessary, clean it to remove tarnish or stains. Then fasten it to an easel or suitable support where it can receive a direct light striking it at right angles: a side-light or top-light is undesirable. It is sometimes found necessary to cover the lens brass work with the focussing cloth, to avoid the bright metal being reflected by the polished Daguerreotype plate. Ripe bromo-iodized collodion and iron development answer. In copying paper photographs the proceedings are very similar.

W. W.—We have never used a gold toning bath containing borax. The proportions, &c., would need determining by experiment. We are not aware of any special advantage to be gained by the use of this salt. The india-rubber glove you forward would be, we have no doubt, quite safe for use in developing collodion plates.

J. H. Kingham.—Considerable experience is necessary to secure really good collodion positives. In the first place, a collodion of tolerably good body is necessary. The face should be well lighted, and the exposure should not be much less than for a negative. The development must not be carried so far as for a negative. A fifteen-grain solution of iron, with fifteen minims of acetic acid and one-minim of nitric acid, answers well. If we had seen one of your defective plates we could have better judged of the nature of the fault than we can from your description only.

W. J. B.—By a little ingenuity you may light the sitter pretty well in the open air. Choose a place, if you can, where two walls join and form a right angle; place your background against one wall, and the other will shade one half of the face. If you can have the use of a clothes-horse of three wings, hang your background over the middle one, and a sheet over one of the wings. This latter will shade one half of the face from direct light, and permit you to throw a reflected light on this shaded side; whilst the third wing may be used to modify the light if necessary; if not, it may be put back so as not to interfere with the light. A sheet stretched like a canopy over head will protect the top of the head from direct light, and so prevent deep shadows under the eyes, &c. A few trials will enable you to produce very fair lighting in this way without a studio. 2. To remove silver stains from the fingers, make tincture of iodine by dissolving eight grains of iodine in an ounce of alcohol, rub the stains with this, and then apply a saturated solution of hyposulphite of soda. A piece of pumice-stone is also very useful

Cumbrian.—We believe that the scenograph is a useful little instrument for small work, and we see no reason why it should not answer your purpose.

Vawn.—Carbon tissue—that is, paper coated with gelatine and pigment—floated, in the dark, upon a solution of fifty grains of perchloride of iron and fifteen grains of tartaric acid in an ounce of water, becomes insoluble, but is soluble after exposure to light. Paper so prepared and exposed under a transparency instead of a negative gives direct pictures. A final wash of dilute hydrochloric acid is necessary to remove the tint left by the iron salt. The print is then washed and dried. 2. No good gelatine is soluble in cold water, and slowness of solubility when heat is applied is generally regarded as a good quality. You cannot, we think, increase the solubility of gelatine without injuring its quality. 3. Chrysoidine may be obtained of most photographic chemists. We know Mr. Solomon keeps it, and have seen excellent adiactinic silk and muslin which he prepares with it. We do not know the price.

R. P.—Boil until nearly dry, and then put it in a warm place to crystallize. Then remove the crystals and wash them with distilled water.

Photo.—Captain Abney's two works on photography, which may be had of our publisher, will give you the most information on the chemistry of photography.

T. E. B.—The address of the gentleman you name is 326, Camden Road, London, N.W.

Duffell and Co.—Thanks. In our next.

S. Smuin.—Yes, the india-rubber is pure, and suitable for the top of a water-tight bath.

A. Durand.—Many thanks. In an early number.

Several Correspondents in our next.

The Photographic News, May 24, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Next Autumn Exhibition—Mr. England's Dry-Plate Work.

The Next Autumn Exhibition.—The announcement of the President of the London Photographic Society, that the annual exhibition would be held as usual, to open some time in October, and close in November, affords members and exhibitors plenty of time for the preparation of their pictures. That medals will be given again this year is an evident sign that general satisfaction was, on the whole, felt in the way these awards were distributed, and there will, we suppose, be little deviation in the regulations this year. Now that there are more works sent in than can possibly be exhibited, and the attendance of visitors has attained to many thousands, it is well worth the while of both professional and amateur photographers to get pictures hung if they can. The number of visitors last year, we believe, was unprecedented; but if many circumstances were favourable, there were also some disadvantages to be taken into consideration, one of the most important of these being the fact that Pall Mall East, as a carriage thoroughfare, was stopped during the greater part of the time. Nevertheless, as we have said, the exhibition was exceedingly well visited, the numbers, our readers may remember, being no less than 6,772. Of these, far more than half paid shillings and sixpences at the doors—namely 4,443—while upwards of sixteen hundred catalogues were sold. This, if it proves nothing else, betokens very considerable interest on the part of the general public, and as photographers have not, as it is, much opportunity for displaying their work, the autumn exhibition in London furnishes a most eligible place to do so. If they can secure a medal for their work, so much the better; but this is not everything in an exhibition of this sort. Mr. Slingsby's picture "Alone," for some unaccountable reason, did not attract one of these awards; but the mere fact of its exhibition has been, we are glad to say, otherwise a matter of considerable profit to the artist. Several hundred pounds have already been spent by the public upon copies of this well-known picture, and the sale of it is so good that we hear a companion print is forthwith to be produced by Mr. Slingsby. So that medals are not the only reward photographers have to look forward to, as many exhibitors imagine. There must always be an element of chance mixed up in the distribution of award of this kind, and the majority must always be disappointed. Last year, for instance, although eminent Royal Academicians formed part of the jury, one or two of the decisions were so absurd as subsequently to call forth the smiles of the jury themselves. Human nature is not infallible, and juries, as juries, have never enjoyed a name for doing sapient actions. At the same time, it is absurd for exhibitors who have once before received the honour of a medal to imagine that from that moment they possess a monopoly in bronze, that whenever they please to send to an exhibition they must inevitable receive a medal. Yet this seems to be the opinion entertained in some cases. Like man-eating tigers, or searchers for theatrical orders, when they have once attained the object of their desires, they always want more. There is no exhibitor so dissatisfied and discontented as he who has once taken a medal and fails to secure the honour a second time. Arguments are useless and explanations thrown away in his case; he will listen to none. And the humble individual who has worked his hardest, and never so much as had his works properly hung, fails altogether to comprehend what his friend is raving about. As we have said before, so we would urge photographers again, not to set too much store upon medals; accept them when they come, and be grateful for them, but thank fortune as much as your skill and perseverance, for be assured that it is owing to the former no less than the latter that the award has reached you.

Mr. England's Dry Plate Work.—Those who had the opportunity of seeing the prints and negatives brought to the meeting of the Photographic Society by Mr. William England the other night must have felt that the advocates of dry-plate photography were quite capable of holding their own. It is presumed that Mr. England did not bring his worst specimens with him to illustrate his process, but all who know that gentleman's careful work (and who does not?) is quite aware how uniformly good it is. One negative which Mr. England passed round to the Society was a marvel. The most rigid inspection failed to show a trace of retouching or dodging. There were the mountains on the horizon so delicately limned that nothing but photography could possibly have produced such delicate effects; while in the foreground was foliage as rich and fresh as only young summer leaves really are. The prints—of which, perhaps, half a hundred were handed round for the inspection of members—were none less conclusive of the merits of a good dry-plate process in the hands of a master. The delicate creamy horizon, the vigour in light and shadow, and the clear, translucent character that pervaded the whole, were evidence sufficient to convince the most sceptical that perfection in photography is alone inherent to wet plates. Mr. England's process is not a short nor easy one compared to many that have been made known, but then that gentleman, we must remember, is no advocate of short-cuts. Like another old master in dry-plate photography, Russell Manners Gordon, he is particularly fitted, by his careful, leisurely manipulation, to overcome difficulties, and this he does in a steady, persevering manner. He is never in a hurry, he never makes an experiment unless he has ample time to carry it out successfully. When he produces a bad negative, which is probably seldom the case, he knows how to make the best of it, and how to treat it in printing; and when he secures a good one, he takes good care that the full effect of its beauty shall be seen. He is particularly happy, too, in his modifications and improvements of processes; indeed, the method he has now described, as the former albumen process, are both of them, he tells us, the same in principle as other well known methods. Nor does Mr. England claim any honour and glory in the matter. He simply tells us that his last improvement was the outcome of an accident, and modestly mentioned how it came about. By employing the beer and pyrogallic acid, he gets wonderful sensitiveness combined with detail. Unfortunately, he tells us little about development, and this is, after all, the most important feature in dry-plate photography. In fact, a paper on the development of dry-plates, and nothing else, would form a most interesting memoir from an experienced manipulator such as Mr. England. We remember some years ago, when admiring the prints of Mr. Russell Manners Gordon, hearing that gentleman remark that he considered the development of two dry plates a very good day's work. Does Mr. England work slowly? That he is exceedingly cautious and careful is apparent, but whether the development of a plate is a matter of minutes or hours he does not tell us. Patience, as everybody knows, is an essential in dry-plate work, and it has been said that an old angler should make a very good photographer, not so much because he has so often studied the picturesque, as that he is invariably a patient man. We doubt not, *en revanche,* that Mr. England would be an apt disciple of the gentle craft if he tried his hand at it. His patience and thoroughness of purpose have doubtless much to do with the success of his dry-plate work, and this it would be well for all workers to remember, whatever the particular process they may put their hands to.

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ON DRY PLATE PROCESSES.

BY WILLIAM ENGLAND.*

Having been requested by our President to detail the result of my experience in dry processes, I must say, that while responding to that request, I yet feel that it is somewhat presumptuous on my part to do so, mainly from the fact that I have nothing particularly new to communicate; but I trust that these few remarks may lead to a discussion which would enable many present, who have had experience and long practice in this branch of photography, to give us the result of their experiments

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* Read before the Photographic Society of Great Britain.

You are all, doubtless, aware that Mr. Paget has offered a very handsome prize for a dry process, which, with good keeping qualities, shall give results as good as those obtained with wet plates. As this offer may, perhaps, induce many photographers to devote more of their attention to the preparation of dry plates, I premise that it would not be inopportune for me to mention briefly some of the dry processes used in the early days of photography, and to call attention to the various methods which have been practised from time to time, and which, in certain hands, have been successful, particularly when long-keeping qualities were not a desideratum.

It is now about fifteen years since I commenced dry plate work. My first experiments were with the Abbé Desprats' resin process, which consisted of the addition of one grain of resin to the ounce of collodion; but unfortunately (for the process is a very simple one), the sensitizing bath would become disordered after the immersion of a few plates. I tried various resins and gums with a view to overcome this objection, but in every case the bath quickly deteriorated.

About this period Major Russell's tannin process was published, and for a considerable time became very popular. I worked it at that time myself, and was quite successful when the plates were freshly prepared, but showed a disposition to solarize, and, after long keeping, to produce hard negatives.

I was next induced to try the Taupenot process; but this requiring a double bath—the sensitizing of the plates a second time, besides other tedious preparations—led me to adopt a modification of it, and which modification was published by me in 1869. This, I found, gave better results, and required but one bath. The following is a short resumé of the method:—After sensitizing the film, a solution, consisting of one part of albumen to one of water, was poured over the plate. which was then rinsed, and a fifteen-grain solution of nitrate of silver applied, a final washing finishing the process. These plates were developed with alkaline pyro.

I mention this process as being one of my early loves, and one with which I was most successful, having produced thereby some three hundred negatives of Rhine scenery. But in spite of my lingering affection for it, I must confess that its keeping qualities were not altogether satisfactory, and I reluctantly gave it up for the gum-gallic process of my friend, Mr. Russell Manners Gordon. Great credit is, I think, due to him for that process, as it was a great advance upon what had been done before, so far as the keeping qualities of the plates were concerned, and the beautifully soft negatives produced. Many, I believe, still follow the process, and I have an example amongst the series of Swiss views shown this evening, and taken in 1870. Mr. Gordon has, I am informed, great faith in the keeping qualities of his process, but my own experience has not borne out this view. I have found that when the plates have been exposed and developed soon after preparation, that negatives of excellent quality—leaving, in fact, little to be desired—could be obtained; and I would strongly recommend it to amateurs as a very good and simple process, but one not, perhaps, so well adapted to the requirements of the professional photographer, who must necessarily, at times, prepare his plates many days and perhaps weeks, before he has the opportunity of using them, and then frequently a long interval between exposure and development.

I can also speak very highly of Captain Abney's beer process. The negatives taken by me, and the prints from which obtained the award at the last exhibition of this Society, were produced by a modification of his process, and which I will briefly describe. To any good commercial collodion is added (in addition to the usual iodizer) two grains of bromide of cadmium. The sensitizing bath of not less strength than from forty to forty-five grains to the ounce, the plate remaining immersed from four to five minutes. After removal from the bath, and before applying a preservative of beer only, the plate is thoroughly washed. The plate should then be dried, and before exposure in the camera, a wash of pyro solution, one grain to the ounce of water, should be applied to the plate, and again dried. Captain Abney gives the formula for the preservative as, beer to each ounce of which one grain of pyrogallic acid has been added. Through an accidental occurrence I have modified this, and will here describe it. While working the process during my stay in Switzerland, nearly two years since, I was attempting to develop a plate with the plain pyro developer, but, to my surprise, no image would make its appearance. On consulting my diary of exposed plates, I found that this particular one had not been exposed at all, so that my failure was easily accounted for. After washing the plate I placed it in the drying box, with the intention of exposing it on some future occasion, being curious to know what the result might be. About a fortnight after, having a little leisure, I placed this plate in the camera, and gave it a little longer exposure than I should have given a wet plate. Much to my surprise, I obtained a very perfect negative; in fact, superior to those I had been previously obtaining. Not feeling, however, quite confident, I prepared another plate in the manner above described, and, after drying, moistened one half with water, and poured over the moistened film a one-grain solution of pyro, then rinsed slightly, and dried. This plate, stereo-size, I exposed with twin lenses, and, on development, the half which had been treated with the final pyro wash showed greater sensitiveness and better quality, particularly in the deep shadows, which were very perfectly developed, and was altogether more in harmony with the high lights than those in the half not so treated. I now felt such confidence in this modification of Captain Abney's process, that I confined my operations solely to it, and produced nearly two hundred negatives during my stay in Switzerland that season. Amongst them were some very trying subjects, which tested to the utmost extent its capabilities. I may also add that these plates keep well, both before and after exposure.

As you are aware, there are several other dry processes—the coffee and its modifications, also the morphia, the latter giving very sensitive plates, but with no keeping qualities. These and other processes I have had experience with, and should have preferred to have made some remarks upon them, would it not be taking up too much of your time, and perhaps trespassing a little too much on your patience. I have latterly, however, worked zealously at the collodio-emulsion, and with very promising results, and shall endeavour to test it in every possible way with a view to ascertain if the keeping qualities of the plates may be relied on before and after exposure. Certainly, an emulsion process has considerable advantages, not the least being its simplicity, and the non-requirement of a sensitizing bath. Although I have worked it for several months past, the results, to my mind, have not quite equalled the before-mentioned process; but I am in hopes, with some experiments now in hand, to be more successful; and, should I be so, shall have much pleasure in affording you all the information in my power. I have not entered into the details of the various dry processes, as their manipulation is now so generally understood, and I therefore make no mention of Colonel Stuart Wortley's uranium process, nor of the gelatine process of Mr. Kennett, and some others which I have tried, but have not followed up sufficiently to enable me to give any information which may be of any service.

Before concluding I must strongly impress upon every one working a dry process the necessity of exercising the greatest care in the selection of pure chemicals, and in the cleanliness of all the various manipulations. Drying the plates in a pure atmosphere should be particularly attended to. There is no question that to be perfectly successful more care and nicety are required than in the ordinary wet process.

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PHOTOGRAPHY AT THE LEAST REFRANGIBLE END OF THE SPECTRUM, AND ON SOME PHOTOGRAPHIC PHENOMENA.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

THERE are two subjects connected with the progress of photography that I wish to bring before the meeting this evening. It will be in the recollection of the Society that some time ago I exhibited photographs of the least refrangible end of the spectrum, that is of the red end, and of those dark rays which lie beyond it, and which are usually called the dark heat rays. After four years' research I have now worked out a process that has almost exceeded my expectation, and allows me to obtain negatives of the spectrum which show the detail of these parts better than any I had hitherto employed. Any one who has used a prismatic spectrum will be aware that the least refrangible end is very much compressed, and that the possibility of getting good definition beyond the red end of the spectrum is almost hopeless, owing to the rapid change in focus of the different rays.

The following table will give you an idea of the way in which the red end is compressed. It is taken from Watts' Index of Spectra, and, in considering it, it must be remembered that B is the last line of the spectrum which is easily visible.

	DISPERSION.			DIFFRACTION.
	Crown Glass.	Flint Glass.	Carbon Disulphide.	
B (Red) ...	0	0	0	0
D (Orange)...	236	220	194	381
E (Green) ...	451	434	400	624
F (Blue) ...	644	626	590	784
G (Indigo) ...	1,000	1,000	1,000	1,000

It will thus be seen that in flint-glass, which is usually employed for simple prisms, F to G occupies 374 parts of the whole, whilst with the diffraction grating it occupies only 216 parts; again, with the former, D to B occupies 236, and in the latter 381. Of course the lower down in the spectrum you go, the more compressed will be the wave lengths. Now I have been thus particular in pointing this out, as I have used a diffraction grating instead of prisms for the photographs on which I set most store. I have had placed at my disposal two gratings by Rutherfurd, of New York, one containing 17,280 lines at equal intervals apart to the inch, and the other 8,620 lines to the inch. The former is a beautiful piece of workmanship, silvered at the back; the latter is in speculum metal, not quite so brilliant, but gives such spectra as can hardly be equalled. I need scarcely go into the difference in the spectra of the gratings and of the prism. The one is formed by the interference of coloured rays, the latter by the difference in refractive indices of the various rays. When we throw a beam of light on the grating, if it be a reflection grating (as those are which I am using), and allow the reflected beam to fall on a white surface, we get first a central patch of white light, then at each side of the white patch is a spectrum, commencing with the violet, and ending with the red rays. Beyond these pair of spectra are others extending indefinitely outwards, but running into one another till we get a dirty white band formed. I wish you to note this, as we shall see that in some operations (unless precautions be taken) this mixture of spectra is an evil. From theoretical considerations we are told that the white light dispersed in the first pair of spectra on each side of the white patch cannot be more than one-fifth of the quantity of the original beam falling on the grating. It cannot, therefore, be more than one-tenth in one of the pair. Theoretically, also, we find that the white light available for the second pair of spectra is only one-fourth that of the first. Now this would be a serious loss of light, but when we consider that the second order of the spectrum is spread over twice as much length as the first, the real intensity of any ray is really one-eighth of that of the same ray of the first order, and only $\frac{1}{80}$th of the amount of that found in the incident beam. Similarly, the intensity for the third order is really only $\frac{1}{27}$th that of the full order, or $\frac{1}{270}$ of that of the incident beam. We next have to consider the difference made by the number of lines ruled on the grating. The two I have been employing will furnish a very good example of what I wish to demonstrate. In the grating with 8,640 lines to the inch, the *second* order has the same dispersion as that of the *first* order of the 17,280 lines to the inch. The respective brightness of the *white* light available in each for equal dispersion would be $\frac{1}{40}$ and $\frac{1}{10}$ as before shown, that is, of course, supposing the incident beam to be of the same intensity in each case; the dispersion being the same, this would indicate that, for photographic purposes, the first order of the closer ruled spectrum is better to use to shorten exposure, than the second of that wider ruled. Further, the first order of the latter grating spectra will only be twice as bright in the first order of the former, since it is only dispersed to half the length.

In other words, the brightness of any order of spectrum varies *inversely* as the cube of the order of the spectrum employed, and *directly* as the number of lines in a given breadth of the grating. It is, therefore, better to employ a lower order of spectrum with a closely ruled grating than a high order with a more widely ruled grating, remembering that the resolving power, as it is called, is the same in both, but the light in the former is much more intense than with the latter.

Now, since my purpose of introducing the subject at all was with a view of showing its adaptation to photography, I must touch on the length of camera which it is best to employ. I must first show you the arrangement adopted for employment with the grating. We have a collimator carrying a slit at one end of a tube, and at the other a lens to render the rays parallel. Then we place the grating so that the light coming coming from the sun, and reflected by the heliostat, after passing through the slit, falls centrally on the grating. The white patch of the reflected beam is made to clear the collimator, and the camera, with its lens, is so placed as to receive the order of the spectrum it may be desired to work with. The effect of lengthening the focus of the camera lens is to enlarge the area of the spectrum. It therefore varies in brightness inversely as the square of the length of the focus. Suppose, then, we had to choose between a camera lens of four feet focus and one of two feet focus, we must recollect that the image with the former would only be a quarter as bright as that taken with the latter. In choosing a camera for these purposes, a reference must be made to the focal length of the collimating lens. That which I use is twenty inches, and I find that for my work I get better definition when the focal length of the camera lens is about the same, for be it remembered that when the two lenses are of equal foci, the slit and its image will be of the same dimensions. If I use a six-foot camera, I should prefer to use a six-foot collimator.

Having now cleared the ground, so to speak, I will show you what a grating can do. This negative which I hold in my hand is a photograph of the spectrum from B to A, the latter line being the ordinary limit of visibility of the spectrum. There are between them 130 perfectly defined lines, and, in fact, contains more lines than is shown by Professor Smyth's map of the same region as mapped by visual observation. It was taken with the first order of the closer ruled grating. The next negative is taken with the first order of the smaller ruled grating, and contains about 70 lines, which lie on the dark side of A. Many of these have never been seen by the eye, even by the aid of fluorescence. This next photograph is one which is taken with the same camera and lens, but with three prisms. The last opaque band lies far in the ultra red, is composed in reality of those lines which are so beautifully separated in the grating photograph. It will be apparent how tremendously compressed the prismatic spectrum is when it reaches these great wave lengths.

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* Read before the Photographic Society of Great Britain.

Here are two negatives of E to C, one taken with the three prisims, and the other with the grating. In this case you will note that the prisms have the advantage over the grating; in other words, for the violet end prisms may advantageously be employed, but for the red the grating is preferable. The line furthest down in the grating photograph has a wave length of about 10,000 tenth metres, whilst that of A has about 7,600, and of G 4,300, and of E about 5,250, so the photograph shows rays of light as much below A as E is above it.

I must again call attention to the overlapping of the grating spectra. It will be found that the extreme violet end of the second order of the spectrum overlaps the red of the first order; so that, really, when we are imagining we are photographing the red end, we really get a picture of the violet end *plus* the red end. The first photograph of B to A was taken with red glass placed before the slit of the spectroscope, hence all the violet and blue rays were cut off; but it struck me that a photographic plate would have a much better chance of perfect results if, instead of absorbing this light (and also a certain amount of the red), we could separate the spectra. To do this, Fraunhoffer's plan of placing a prism so as to refract the *length* of the slit before the beam reached the grating was adopted, and here are the results in a photograph taken with a small camera. It will be seen that we have four orders of spectra on the same plate, each one well separated from its neighbour. The photograph which showed the ultra red was taken by this plan, and no doubt you will have noticed that it was eurved in its length. The curvature you must have noticed in the four spectra which I showed, and is due to the irrationality of the dispersion of the prism. Had I used a widely ruled grating, I might have attained a straight band crossing the plate diagonally, but the loss of light would have been so great that I was forced to adopt the prism; for had I used the first order of the spectrum in both cases I should only have been able to utilize about $\frac{1}{100}$ th part of the beam of light coming through the collimator, since $\frac{1}{10}$th would have been lost after using the first grating to throw the slit in one direction, and $\frac{1}{10}$ th of that would have been lost by the other grating.

To be continued.

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A TOURIST'S PRESERVATIVE DRY-PLATE PROCESS.

BY T. SEBASTIAN DAVIS.[*]

As it may not be inopportune for members to describe the dry-plate process which they find the most practically useful, I venture to direct attention to the following. My aim has been principally directed to prepare films by the use of a collodion and bath combining with long-keeping properties adaptability to the ordinary wet process worked with iron development. The great susceptibility of highly sensitive films to injury from weak luminous radiations during preparation, exposure, and development, render reliable plates of moderate sensiblity a perfect desideratum. Such, when worked with others of high sensibility, if easily prepared and developed away from a specially constructed laboratory, constitute, in my view, essential requisites for the amateur landscape photographer.

The method I adopt for the preparation of films of the less sensitive type, it is my present purpose to describe. Although any collodion of recognized standard excellence for iron development is perfectly suitable, yet I should deem this description incomplete were I to omit a formula equally adapted to this or the wet process. I must confess that, in the manufacture of pyroxyline, I have not found the three-to-one proportion of sulphuric to nitric acid, originally recommended in the patent for explosive cotton, and subsequently ably advocated for the soluble varieties, to be the best. The employment of a larger quantity of nitric acid to the sulphuric yields, in my hands, a better result for the soluble kinds. The following formula is based, therefore, on this oonsideration:—

Sulphuric acid, sp. gr. 1·84 ...	6 fl. oz.
Nitric ,, ,, 1·42 ...	3 ,,
Water	5¾ fl. dr.
Cotton	150 grs.

Temperature 155° Fahr. to 145°; time of immersion, 10″.

The double temperature given signifies that, at the time of the introduction of the cotton, the acids should be at 155°, and the allowable decline must not exceed ten degrees. Six fluid drachms of a plain collodion, made by dissolving from five to six grains of the above pyroxyline in a mixture of four fluid drachms of methylated ether, sp. gr. ·720, and two fluid drachms of pure alcohol, sp. gr. ·820, is to be mixed with a bromo-iodizing solution made as follows:—

Sodium iodide	6 grains
Cadmium bromide	4 ,,
Iodine	½ grain
Gum guiacum	¼ ,,
Alcohol, sp. gr. ·820	2 fl. dr.

Before coating the plate, I apply a substratum consisting of an ounce of liquid albumen and 30 minims of "liquor ammoniæ," sp. gr. ·959, dissolved in an imperial pint of water. After the plate is coated, excited in an ordinary argentic nitric bath, and removed therefrom, it is to be freely washed in ordinary water kept in motion, and then treated with the following preservative, poured on and off the film twice or thrice from different parts.

Preservative.

Albumen	1 fl. oz.
Glucose solution (raisins 1 part, water 5 parts)	2 ,,
Water	3 ,,
"Liquor ammoniæ" sp. gr. ·959	15 min.
Ammonium chloride	3 grs.
Ammonium bromide...	½ gr.

The film is again to be freely washed with ordinary filtered water, and covered with a three-grain solution of gallic acid, and evenly dried. The back of the glass, as a matter of precaution against very trying conditions, rather than as an ordinary necessity, should be covered with a non-actinic colour. Burnt sienna ground in water and mixed with a little gum mucilage, constitutes a good medium for the purpose.

At any convenient interval after exposure the film is washed, and developed with a suitable quantity of solution made in the following proportions:—

Water	4 fl. dr.
Pyrogallic acid (64 grs. dis. in 1 fl. oz. alcohol ·805)	15 min.
Potassium bromide (16 grs. in 1 oz. water) ...	15 ,,
Sodium carbonate (64 grs. in 1 oz. water) ...	15 ,,

Five minims only of the potassium bromide should be added in the first instance, and the remainder upon the earliest indication of an image. As soon as the general details of the picture become faintly visible by reflected light, the alkaline developer should be removed and a three-grain solution of citric acid applied. The intensification may then be effected with pyrogallic acid, citric acid, and argenic nitrate, and the unreduced salts dissolved away with sodium hyposulphite as usual.

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[*] Read before the Photographic Society of Great Britain.

PHOTOGRAPHY AT THE ROYAL CORNWALL POLYTECHNIC EXHIBITION LAST YEAR.

The official report of the Royal Cornwall Polytechnic Society has just reached us, and is a very interesting document. We extract the report relating to photography :—

Judges.—*Messrs. W. Brooks, W. N. Carne, and G. Lanyon.*

The judges in the photographic department regret to observe a falling off in regard to the number of exhibits this year ; it may be attributed to the run of unfavourable weather we have had in England during the past twelve months, which has been very much against landscape photography and all out-door operations. But, at the same time, there is a very important feature in the present exhibition that must not be overlooked, and that is the great skill that has been displayed, both as regards artistic feeling and perfect manipulation, which will at all times more than compensate for any falling off in numbers. Some of the productions this year are truly marvellous, and of the highest possible order, in both the professional and amateur sections.

The first in the catologue is a very large composition picture, "When the day's work is done," by H. P. Robinson, of Tunbridge Wells, being the finest we have ever seen exhibited by that gentleman: it has been awarded a first silver medal.

Messrs. Frith and Co., of Reigate, send some very charming productions of large size (20 in. by 18 in.) ; the best is "Trinity Chapel, Canterbury Cathedral," with the tomb of Henry IV., contrasting very forcibly with the generality of interiors, which, even of smaller size, are very heavy through under-exposure. This one in particular is free from that fault ; it is very soft and at the same time brilliant, and free from blemishes of any kind : to this picture has been awarded a first silver medal. Messrs. Frith also send several others, of subjects of local interest and some Swiss scenes, which are very fine.

Mr. Reuben Mitchell has been awarded a first silver medal for a very clever artistic picture, "A Lancashire Mill Pool," very soft and brilliant.

Mr. F. Palmer sends some good illustrations of Swiss scenery.

Mr. Edwin Forhead sends four pictures. The best is a study of plants and flowers, the others are landscape subjects, possessing several good qualities.

J. Millman Brown contributes some very good studies. His best, "The Valley of Bonchurch," Isle of Wight, receives a first bronze medal.

Mr. G. H. Drew sends some good pictures of "Stoneleigh Deer Park ;" the subjects are well chosen, but are somewhat overtoned, and do not do the negatives fair justice.

In the portrait department, Mr. G. Nesbitt, of Bournemouth, exhibits a fine collection of portraits. A first silver medal has been awarded to his portrait study (No. 640).

Mr. W. Gillard has a first bronze medal for the study of a head.

Mr. B. Wyles sends several productions, of which we cannot speak very highly, owing to the careless way in which certain manipulations have been conducted.

Mr. S. Fry exhibits three pictures (composition) ; the one of "The Taxidermist" is the best.

Mr. W. M. Harrison, of Falmouth, sends an enlargement of a "Group of Children," in carbon, which is very fine : to this has been awarded a special bronze medal.

Mr. Faulkner, of London, sends some of his well-known exquisite works. Owing to their late arrival they could not be entered for competition, which we very much regret. His "Dorothy and Simplicity" are perfect masterpieces of art, which have been reviewed by the London press, and of which we cannot speak too highly.

Amateur Section.

The exhibits in this department are far above the average. Mr. E. Brightman carries off the palm for his gems, the "Views on the Lynn," which remind us of the work of that eminent amateur, Mr. Russell Manners Gordon, and we think are equal to it, which is saying a great deal : a first silver medal has been awarded to him. Following very closely are some productions of Mr. H. Manfield, of Northampton, but very little inferior to the last-named exhibitor : a first bronze medal has been awarded to "In the Frome Glen."

The productions this year of F. M. Brownrigg we do no think do him justice, having seen work of his that we liked better.

Mr. F. Beasley, jun., comes out very strong this year, which shows that he is a very painstaking worker. We have examples by him of several processes ; his rendering of "Ivybridge, Devonshire," by the collodio-emulsion process, is very fine, and has been awarded a first bronze medal.

We must not omit to notice the productions of J. D. Radcliffe, which, although small, are by no means insignificant ; "Going on an Errand," and "A Quiet Nook," are perfect gems in their way.

Mr. H. N. White exhibits some works stated to be photo-ceramic. We fail to see what part photography has played in their production, and therefore we withhold our judgment.

PRICES AND PREPAYMENT.

Mr. E. V. Dake has some practical remarks on this subject in the *St. Louis Practical Photographer*, which will interest many portraitists. He says :—

As a great deal is being said nowadays about the price of work, I wish to add my mite with the rest. Something less than two years ago I took possession of the rooms I now occupy, and the first day I advanced the price of pictures. The man I bought out had failed to make a living by making ferrotypes at four for fifty cents on a 5 by 7 plate, and he charged two dollars per dozen for card photographs. I raised to one dollar for four ferrotypes, and three dollars per dozen for cards. That is my price to-day, and I have five times the work to do that he had. It is all nonsense to work for nothing and board yourself, for, if you do, you will be obliged to wear out somebody else's old clothes or go naked.

I wish that I had to-day the money that I have been swindled out of during my lifetime by bogus sitters, but as that is not possible I shall guard against the fraud in future. I demand my pay when the negative is made. No matter who the persons are, they must come down with the stamps. If they are honest, they are willing to ; if they are not, I have lost all I want to lose, so I throw the negative into the wash. My customers must rely on my honesty and judgment for a good portrait ; they are not supposed to be good judges of a negative, and if I make a faulty one I sit them again. When I know that I have a good one, I want to be assured that I will be paid for the balance of the work in making the prints. Some people call it paying in advance, but I do not. I am supposed to have done a considerable amount of labour to prepare the instruments, chemicals, and rooms, besides the money expended to make the party a dozen cards ; then I add the work of sitting the party and making the negative. Now I think it is time to see the colour of his money. It is me that has been making the advance, not him ; and if I have a reputation for honesty and he means business, I will take the money now, if you please. I don't pity an artist one particle when he shows me the great pile of cards packed away that never have been called for, and hear him mourn over the loss of time and money in their manufacture, for it is his own fault : he should have had his pay when the negative was made ; and when I tell him so he says, "Why, I would drive away too many of my customers, and lose their trade entirely." You would? Well, now, you just take your books and see just how much you have lost by bogus sitters in the last five years, and then compare it with the amount you would lose by demanding pay down. If you figure it right close you will find that nine times out of ten it is this very dead beat that gets mad because you want your pay, and, if you let him go, you will more than save all you possibly lose, by honest, sensible people refusing to patronize you. When people find that you have business rules, and that you adhere to them strictly, they will willingly conform to them, and give you credit for real business tact.

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THE ALLEGED INSTABILITY OF CARBON PRINTS.

In the May number of the *Photographic Journal*, just issued, we find a letter from Dr. Van Monckhoven, in the course of which he answers some observations we made in reply to a communication he sent us some weeks ago. We may remark, in passing, that the system of answering by a letter in one journal the observations which appeared in another, is at least inconvenient, and at times scarcely fair. We have always hitherto found Dr. Van Monckhoven eminently a considerate and courteous controversialist, and regret any departure from this, either in his matter or manner. He denies that he has ever used a transfer paper containing sulphate of baryta, as we suggested. And he adds that "it is contrary to the most elementary ideas of chemistry to affirm that barium sulphate combines with chromic acid to form barium sulphate." We are bound, of course, to accept Dr. Van Monckhoven's statement that he has never used a transfer paper containing sulphate of baryta. But it is scarcely ingenuous to make this denial without any allusion to the grounds of our assumption that such a paper was used in the Doctor's experiments. In a communication from Dr. Van Monckhoven, which we printed on the twenty-second of March, he directs us, in order to verify his experiments, to coat paper with bichromated gelatine to which sulphate of baryta has been added—in short, to make the equivalent of an enamelled paper containing the baryta salt. If the Doctor himself never uses such a paper, why did he direct us to do so, in order to produce the results which he affirms arise in his hands? In regard to Dr. Van Monckhoven's further observations, it is only necessary to say that we were not discussing "elementary ideas of chemistry," but facts. Dr. Van Monckhoven stated that in his carbon operations he obtained, after exposure, an insoluble yellow salt, which we had not obtained, nor had any we had ever heard of, obtained under similar circumstances. Subsequently he suggested that he used in addition a baryta salt, which it was not necessary or customary to use. And as a chromate of baryta is an insoluble yellow salt, which answers to that the Doctor had obtained, we suggested the "possible reactions" between his baryta salt and chromic salt as accounting for the abnormal results which he obtained. Every tyro in chemistry knows the strong affinities which bind the elements of which sulphate of baryta is formed, and that some explanation of its decomposition must be found if our suggested "possible reactions" were the true explanation of the results which Dr. Van Monckhoven, of all carbon experimentalists, alone appears to have met with. He concludes his note in the *Photographic Journal* by "energetically affirming that a simple washing of a carbon print, though it be prolonged for hours, will not eliminate the chromate nor fix the image." We feel sure the worthy Doctor will acquit us of discourtesy if we repeat, in equally energetic terms, that simple washing *will* remove the chromate and fix the print. That it has done so in our own hands hundreds of times, and in the hands of others, we know, hundreds of thousands of times. We have during the last two months repeated many experiments, familiar to us before; we have exposed simply washed carbon prints for many days and many weeks to the rays of a burning sun, without producing change in any save that sent to us by Dr. Van Monckhoven, alleged to be produced on Autotype tissue, but repudiated by the Company. For the present, we submit, the abundance of experience must carry weight over exceptional results.

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LIGHT ANTAGONISTIC TO LIFE.

Most of our readers are doubtless more or less familiar with the beneficial effect of sunshine on life and health. Deprived of sunshine, the general health of almost all animated beings becomes vitiated, natural growth is arrested, and strength fails. In the dark valleys in Switzerland, where the sun's rays rarely fall, goitre and other diseases, dependent upon impoverished blood, are prevalent, whilst on the mountain slopes, exposed to full light, life and strength prevail in full vigour. It is somewhat startling, therefore, to find a record of cases in which light is directly inimical to life, and produces sterility in place of fecundity. As all facts connected with the action of light may, in their turn, prove of interest to the photographer, we reproduce from the *Scientific American* some details of recent experiments unexpected and startling in result.

The experiments of Pasteur, Bastian, and Tyndall, in connection with the germ theory of life, are generally familiar. The reader knows that certain extremely elemental organisms, called bacteria, invariably appear, in the course of a few days in water containing any trace of organic matter, showing active life. Bastian, the champion of spontaneous generation, affirms that they will appear under all circumstances, however pure the water. Tyndall asserts that they will only be generated if the water contain certain organic germs, and various methods of preserving the water from the presence of such germs have been devised. Hitherto the sun's rays have been regarded as favourable to germination, and they are, we know, in many cases, absolutely necessary; but, according to the recent experiments of Dr. Downes and Mr. Blunt, it appears that this is not always so; but that solutions otherwise fertile may be completely and permanently sterilized by the action of light alone.

This fact has been very simply demonstrated by filling test-tubes with Pasteur's solution, placing all under precisely the same conditions, and then protecting some from the light by a sheet lead casing. In the protected tubes the liquid in a few days became turbid and filled with bacteria; the solution in the exposed tubes remained perfectly clear, and no organisms were perceptible under the microscope. This experiment was repeated numerous times, always with like results. The greater the amount of sunshine, the greater the sterilizing effect; and a few days of full sunshine were sufficient to prevent entirely the development of the organisms. Tests were instituted to determine if the action of the light resided in the liquid yielding negative results. It was found that light was directly capable of destroying bacteria, as, if a tube was protected from subsequent contamination, it remained permanently sterile after exposure to sunlight, even though subsequently darkened. By other careful experiments it was determined that less than two hours of direct sunlight is insufficient to prevent the development of bacteria in inoculated solutions. The putrefactive tendency of warmth does not override the preservative quality of light; and the experimenters found that, with a full amount of sun-

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light, tubes could be preserved from day to day as readily in hot weather as in cold.

The action of light was not confined to Pasteur's solution, as urine could be preserved in the same way. It is curious to note that the germicidal influence does not extend to the spores of the yeast plant, and that the light does not retard the growth of the same, there even appearing to be a kind of antagonism between the bacterial and fungoid growths. A series of experiments was instituted to determine the effect of different coloured light on the solutions, coloured glass screens being interposed. It was found that bacteria appeared first in those protected by yellow, and in those almost as soon as when cased in red; next in the red; while those in the blue remained permanently clear. It is difficult to draw any deduction safely from this. The *Lancet* thinks that it points to the actinic rays of the spectrum as the active sterilizing agents, a view in which we cannot agree, inasmuch as blue glass does not transmit the pure blue spectral ray, or even the actinic rays only, but allows rays of all colours to pass, with some diminished in intensity. It acts, therefore, merely as a screen to diminish the power of the light, and the fact that it does so transmit only modified sunlight is indicated by the sterilization produced. Still it is difficult to explain the presence of bacteria under the yellow and red lights, and hence our belief that the correct deduction from this experiment is yet to be made.

One of the most remarkable discoveries of this highly important chain was, that in the absence of an atmosphere around the tubes, light exercised no sterilizing influence whatever. Specimens of the same urine, insolated to the same degree, but preserved in vacuo, became turbid from bacteria as rapidly as others incased in lead. The investigators suggest that "many of the related conditions of organic beings may derive new meanings from the facts now ascertained, and point out the apparent antagonism in origin and effect between the coloured chlorophyl, which owes its origin to light and is deoxidising in its action, and the colourless protoplasm which it shields, and to which, apparently, at least in some of its forms, the solar rays are not only non-essential, but devitalizing and injurious."

These experiments may be regarded as all the more striking when brought into comparison with some of M. Pasteur's later discoveries. Now long ago he held a discussion with M. Boussingault on the question of the influence of solar radiation, the latter holding that, if solar radiation should disappear, life would be impossible. Pasteur, on the other hand, maintained that it would continue in certain inferior plants, and occasion the most complete organic growths; and he adduced as an illustration the life of the *Mycoderma aceti*, which may take place in darkness on a liquid composed of alcohol, acetic acid, and mineral phosphates. It will be observed that Pasteur's demonstrations that oxygen and light are not necessary to life are remarkably corroborated in these latest researches of the English biologists. Not only may organisms live in darkness, but light becomes an absolute source of destruction to them; not only may they exist without oxygen, but a vacuum forms for them an efficient protection—two conclusions as flatly contradictory as possible to preconceived notions regarding the omnipresent necessity for oxygen and light on the part of all organic nature.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

The forty-sixth annual Exhibition of this Society will open on Tuesday, the twenty-seventh of August, when medals and prizes will be awarded to photography as on former occasions. We make the following extracts from the official programme, so far as it relates to photography:—

Sec. I.—Professional Photographers.

1.—For the best Landscape, size not less than 14 in. by 11 in.—a Silver Medal.

2.—For the best Landscape, size not less than 11 in. by 9 in.—a Bronze Medal.

3.—For the best Landscape by the Collodion Emulsion process, size not less than 9 in. by 7 in.—a Silver Medal.

4.—For the best Landscape by the Gelatine Emulsion process, size not less than 8 in. by 6 in.—a Silver Medal.

5.—For the best Interior by any process, size not less than 11 in by 9 in.—a Silver Medal.

6.—For the best Portrait, taken direct, size not less than 14 in. by 11 in.—a Silver Medal.

7.—For the best Portrait, size not less than 10 in. by 8 in.—a Bronze Medal.

8.—For the best Group, composition or otherwise, size not less than 14 in. by 11 in.—a Silver Medal.

9.—For the best Enlargement Landscape (in Carbon), size not less than 20 in. by 16 in.—a Silver Medal.

The Judges may decline to make any award in any of the above classes where there are less than three competitors in that class.

All work that has been elaborately touched, either on the negative or print, will be excluded from competition. Slight spotting only allowed.

In all cases state whether Professional or Amateur, and name of process for the production of the work.

Carte-de-Visite Portraits are excluded from Exhibition.

Sec. II.—Amateurs.

Medals are offered for productions in this department.

Regulations for Competition, etc.

Competitors are divided into four classes:—

1.—The First Class consists of Members of the Society; also of persons who pay 3s. to be allowed to compete for prizes. First-class competitors are entitled to admission on the first day of the Exhibition, after twelve o'clock.

2.—The Second Class consists of persons of the working order.

3.—The Third Class consists of schools for the higher branches of education.

4.—The Fourth Class consists of schools for the children of the working orders.

5.—The Second, Third, and Fourth Classes may compete for Prizes without any subscription, but are not entitled to free admission to the Exhibition.

6.—No person shall be entitled to a prize for any article which has appeared at a previous Exhibition of the Society, unless exhibiting some improvement.

7.—In the Department of Fine Arts, Professional and Amateur Artists must state whether their productions are original or copies.

8.—The Judges are empowered to award Prizes in money to the extent of £1 only, except in the case of Special Premiums. When medals are awarded, the converting them into money, according to the following scale, shall be at the discretion of the Committee:—

First Silver Medal	£5	0	0
Second ditto	3	10	0
First Bronze Medal	2	0	0
Second ditto	1	5	0

9.—Medals only (not convertible into money) can be awarded to patented or registered articles.

10.—No competitor may receive more than one Medal or Prize in the same department in the same Exhibition. (This Regulation does not apply to mechanical or scientific inventions, or to photography.)

11.—No holder of a Medal or Prize may receive a Prize of the same or a lower value for similar subjects in the same department at the *next* two subsequent Exhibitions; but the Judges will be empowered to give certificates of merit to persons excluded by this rule.

12.—The carriage of all articles sent to the Exhibition must be prepaid, unless permission to the contrary has been previously obtained from the Secretary. Pictures and other works of art may, however, be sent free under certain regulations to be learnt of the Secretary.

13.—All awards are at the discretion of the Judges, and none will be made if no article be deemed of sufficient merit.

14. *All articles intended for exhibition must be delivered at the*

Polytechnic Hall, Falmouth, one week before the opening of the Exhibition, or they will not be eligible for competition.

15.—No article exhibited can be removed from the Hall, before the close of the Exhibition, without the consent of the Secretary.

16.—The Society is not responsible for loss of, or injury to, any article sent for exhibition.

⁂ Information respecting the Society and the exhibition, and forms to be filled up by the exhibitors, may be obtained from the Secretary, EDWARD KITTO, Polytechnic Hall, Falmouth. Information respecting the Art Union may be obtained from the Honorary Secretary, Falmouth.

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FRENCH CORRESPONDENCE.

MORE ABOUT THE ENGLISH PHOTOGRAPHS AT THE INTERNATIONAL EXHIBITION—THE FRENCH PHOTOGRAPHS—WORKING PROCESS OF THE MONITEUR UNIVERSEL—OFFICIAL REGULATIONS OF THE EXHIBITION.

More about the English Photographs at the International Exhibition.—My anxiety to be the first to tell the English artists how their pictures are shown in the Exhibition, and, above all, to testify as to the excellence of the works that I had been able to examine, necessarily had the result of making my report incomplete. In my last letter to the PHOTOGRAPHIC NEWS, written on the 6th May, I was only able to mention the works which had been hung for exhibition up to that date, and even of those fixed in their places no inconsiderable portion bore no indication as to their authors. Since then, the English exhibition of photography has been very much increased, in fact, it has been nearly doubled; the new-comers I will make the subject of my next letter, for I prefer to wait till the arrangement is definitely finished, so that my own account itself may be quite complete. To the absence of labels, as I have above observed, however, and of any sign by which the name of the exhibitor could be recognized, is due an error which I was then unlucky enough to make, and which I hasten at once to repair. I had attributed to Mr. Robinson a fascinating picture entitled "Alone," representing a young woman sitting on the seashore, and gazing out sorrowfully on the horizon; this picture, and a charming portrait of an old lady with white hair, are hung on the same screen as Mr. Robinson's works, and close to them, but they are shown by Mr. Slingsby. The way in which I have confounded the productions of these two equally talented artists will, I trust, not hurt the feelings of either of them.

The French Photographs.—The French exhibition of photography, though much less numerous than it should have been (there are only 200 photographers and manufacturers represented), is very interesting and very complete, for it contains a great variety of processes and novel applications of the art. There is a large number of remarkable portraits enlarged by the methods of Monckhoven, Lambert, Carette (of Lille), &c., which affords us an opportunity of comparing the merits of these different methods. Two provincial photographers, MM. Cheri Rousseau (of St. Etienne) and Monowy (of Angers) exhibit pictures of this kind, which are well worthy of attentive study. The works sent by the former of these two artists are more especially interesting from their being executed in tinted carbon, and with a low toned colour evenly distributed. This gives them the appearance of drawings in black crayon mixed with a very little bloodstone. This is a novelty worthy of mention, for it shows the result of intelligent and artistic appreciation of the carbon process. In other respects the new methods of carbon printing are admirably represented in the French section. Carbon prints are very numerous, and several of our principal photographers have filled their frames with them exclusively. Photoglyphs, phototypes, and photolithographs are represented by a great number of remarkable specimens. As regards heliographic and phototypographic engraving, they occupy an important position in the gallery. Among the usual competitors in this branch of the art a fresh rival has, on the present occasion, made his appearance—M. Michaud, of Grenoble, whose reproductions of engravings give signs of great promise. The principal marks of excellence that characterize the method of M. Michaud are—1st, the rapidity with which the photographic negative is converted by chemical means into an engraved plate (a few seconds are sufficient); 2nd, great cheapness. Both of these are very valuable conditions for the successful working of an industrial process.

Working Process of the Moniteur Universel.—Chromo-photography is not only represented by a great number of specimens of every kind in the gallery reserved for the French photographs, it occupies also a special position in the park of the Champ de Mars. This pavilion consists of two galleries: in one are exhibited specimens of the most important work executed in the workshops of the *Moniteur Universel*, under the direction of M. Leon Vidal; the other is fitted up as a working room, with a turning table on which are six photoglyptic presses of different sizes. Here, before the eyes of the public, will be carried on the operations of printing by the Woodbury process, not only in black, but also in colours. As is well known, M. Vidal has succeeded in adapting this process to his chromo-photographic pictures. The emulsion processes, of which we have recently heard so much, will be illustrated at the Exhibition by a large number of specimens; these constitute the most important novelty that has been developed since the Great Exhibition of 1867. Among others, M. Chardon has sent some examples of great excellence. I cannot pretend to give here more than a mere summary account of this part of the Exhibition, which, even now, can be scarcely said to be open. I can only point out what I believe to be its chief characteristic, and this, as I have above stated, is to recall to recollection the processes that have been employed and the applications introduced of late years. It is this which gives to the Exhibition its principal interest in the eyes of visitors who are competent to form an opinion. All the world knows that for a series of years works of abounding excellence have been produced by photography, but it is a great advantage, as I have already said, to be able to compare the results obtained by different methods, as well as to make acquaintance with the different applications to which they lend themselves.

Official Regulations of the Exhibition.—In the PHOTOGRAPHIC NEWS of the 17th May I see there is a translation of the regulations issued by the Commissary-General for the guidance of those French or foreign photographers who wish to take photographs in the Exhibition. Though anything like monopoly is abolished by these regulations, they are far from meeting the requirements and aspirations of those who are interested. One of our best known photographers has written me a letter on this subject, wherein he protests against Article 8, which runs as follows:—"The application of exhibitors who may wish to have structures or objects belonging to them photographed shall contain (1) the name and address of the photographer whom they have chosen; (2) *the precise indication of the objects* the photographing of which is desired; (3) the *day when the photographing is to be done*," &c. My correspondent complains that the last two conditions impose a restraint which will render all photography in the buildings and grounds of the Exhibition almost impossible. The requirement to point out precisely each object for reproduction will render the applicant liable to a refusal of permission for anything which may happen to have been forgotten in the list. Again, the necessity of fixing beforehand the day on which the photographs shall be taken will possess the great inconvenience of forcing the photographer to proceed with his work at a time when the surrounding circumstances may be most unfavourable. But, in addition to these prohibitions, a further obstacle is raised by the regulation contained in Article 11; according to the terms of this Article, photographers are only permitted to work for two hours in the day (from seven to nine o'clock in the morning), a restriction which will probably make the production of good negatives out of the question. These remarks appear to me to be well founded; it is possible that they have already occurred to some of the readers of the Photographic News. While giving them publicity on this occasion, I think it right to express my opinion that in laying down these rules the executive has only had the object of providing itself with a weapon against any attempt at abuses of the privileges accorded, and that as there is no intention of applying in all their rigour the prohibitive clauses of the regulations that I have just pointed out, there is, I believe, no reason to be frightened at these restrictions. Ernest Lacan.

THE PORTRAIT.

BY WM. HEIGHWAY.

The appreciative mind of the artist, keenly alive to the beauty of nature, finds the greatest gratification in the delineation of the human face. His the task to honestly and fearlessly portray, whether it be the sweet, winsome face of the innocent girl; the rugged countenance of the man, every line speaking of strength, resolution, and energy; or the front of age, wrinkled—scarred, perchance—with its seams, lines, and furrows, the tracery in which the Great Artist has written the story of a life.

The artist has here to depict not so many features that go to make up a face, but the character written thereon, to catch a reflection of the spirit which has modelled those features into what they are.

Would you try to transform awkwardness into grace, old age into youth, coarseness into refinement?

Why, then, if you succeed, your success is failure, because it is not true and fitting.

You have of course heard the old adage—"It is impossible to place an old head on young shoulders," but it is more ridiculous to try to place a young head on shoulders bent with age, or that of an Apollo on an almost worn-out body.

It would be a palpable fault—nay, worse, it would be a ridiculous mistake—at which the most juvenile old gentleman that dodders down Regent Street, or suns himself in Piccadilly, would smile in derision.

We may have our standard of beauty, and recognize it only in symmetry, softness, and smoothness—the well-liking of childhood and youth; but there is beauty also of maturity and age, and if we cannot appreciate this, depend upon it there is something wrong with *us*.

If this is recognized and properly esteemed, there will be no danger of any attempt at falsification in the portrait, no refining and botching to correct nature's work.

If any misguided man or woman be dissatisfied with the face nature has ordained he or she should carry, it is not for us to make our art a vehicle for falsehood. The individuality of that face ought to be more precious than the smooth unwrinkled thing the photographer may be able to produce as a likeness.

It is very sorrowful and shameful that we pander to such stupid whims. There is more of nobility, of beauty, in the most rugged, "ugly" face ever made, than there can be in the most beautifully retouched and polished thing of the photographer's contriving.

Why not at once get a nicely modelled barber's block, all blankly expressionless and woodeny, and photograph that for such sitters?

(Mind, this is no tirade against retouching, but a little protest against perversion and untruth; for which the photographer is, in many cases, only responsible in a secondary degree, as an aider and abetter.)

Perhaps it is natural for us to desire to seem better than we are—it may be one of the yearnings of our imperfect nature, a dissatisfaction which is rather pathetic than absurd.

It may be but the expression of an undefined feeling that there is something within more than the ordinary eye can see—a refinement, grace, beauty—in a word, a better and nobler self, the which the soul of the artist ought to respond to.

But this is an entirely separate thing from the vulgar wish to be made pretty at the expense of truth.

The response to the true wish is the recognition of one noble soul of another, an inspiration; and answering that appeal worthily is only possible to the artist; but to pander to the mean and false desire is unworthy, impossible.

Try to recognize that there is in many instances a higher and truer beauty than appears on the surface, and you are helping in the grand work of making man better and nobler.

Is this too great a thing for the artist to do? I think not! But even should it be, the lesson has still its weight as being that of securing success in portraiture.

Let your aims soar into the realms of the ideal. If you go up like a rocket only to come down like a stick, I don't believe you will be any worse for your journey, or that your bruises will be very serious. But I don't believe in any such catastrophe befalling you.

Don't underrate the power of your art. Yours it is to discover and render the best to the highest and noblest life.

We want more of culture, of feeling, of *inspiration* in the portrait of the camera; without it nothing but poverty and unsympathy can be expected.

Failing the better qualities shown in the works of painters, photography must ever be an unworthy relative to art; but these qualities brought into play, photography must take a very grand position.

It is not to say these things can never be, because some productions of the camera evidence how much is attainable—and who shall place a limit on possibilities?

DIRECT INK PRINTING FROM GLASS NEGATIVES.

BY HANS BRAND.*

To make negatives capable of being printed from they must be coated with a solution of chromatized gelatine, but only after they are perfectly dry. By this means a layer of chromatized gelatine is deposited over the collodion film. But it is well known that when such negatives are exposed in diffused light the lines become broader than they should be, because the light, even with thin films, can act sideways. In order to obviate this I tried to form a film of chromatized gelatine in that of the collodion negative, and I was fortunate enough to be completely successful. The method that I adopted was to fix the negative immediately it was taken, without first drying, then to wash it with water, and while still wet to immerse it in a dilute solution of chromatized gelatine. When dry, the surface was quite dull, without any sign of gelatine upon it; the collodion film had, notwithstanding, absorbed sufficient chromate and gelatine to be capable of printing from after exposure.

The best method of obtaining these plates with what may be called a typographical collodion film is as follows:—First take an ordinary, but not an intense, negative on an albumenized plate-glass plate, fix it at once, wash it, and then plunge it into the gelatine solution, which should be prepared in the following way:—4·5 parts of gelatine are allowed to soak and swell up in water, the excess of fluid is poured off, and the remaining gelatine dissolved in 50 parts of distilled water; then a solution of 5·5 parts of ammonium bichromate in 100 parts of water are added, and the whole is heated to 75° C. In this bath the plate must remain for about five minutes. When large plates are used, the solution may be flowed over them, taking care to wash them rapidly with warm water beforehand. In this case

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tograp hische Correspondenz.

too, it is necessary to repeat the coating with chromatised gelatine several times. After the plate has taken up a sufficient quantity of the solution it is placed in a horizontal position and heated over a spirit lamp. Should fumes come off, the plate must be held upright for a minute or two, and again laid horizontal, and further heated until it is quite dry. It should not be made hotter than the hand can bear when passed over the reverse side.

For negatives of this kind the time of exposure cannot be accurately determined by the eye, nor can it be measured by the ordinary photometer. I overcame this difficulty by first well wiping the prepared negative on the reverse side, and then laying on the film side a small piece of albumenized or chromatized paper, exposing the whole in a frame on the reverse side to the light. By aid of this simple expedient the action of the rays of light can easily be watched, so that places which are too dark can be covered, and all the other artifices used which are common in silver printing. Commonly a black support is employed to avoid the reflection of light, but in this process, as I have described it, reflection need not be feared, notwithstanding the white albumenized paper, for the silver chloride absorbs all the rays of light.

As soon as all the finest lines of the image are distinctly visible, the ammonium chromate must be washed out by dipping the plate into cold water; the plate can then be dried, and placed in the hands of the printer. The finest rollers must be used for printing. When the plate is damped I would recommend that a little gum arabic be dabbed on the edge, and rubbed over the surface of the picture. As regards the production of the negative, I should observe that it is not every collodion which will take up the chromatized gelatine; there are collodions which will not absorb the gelatine at all, so that a layer of chromatized gelatine merely is obtained on that of the collodion. The lithium collodion, prepared by Kurz, of Wernigerode, is best adapted for this purpose. Probably the lithium salt in this collodion plays no unimportant part in the reaction, but I have not had an opportunity of making experiments on this point.*

Correspondence.

LIGHT AND SHADE IN PORTRAITURE.

SIR,—These few lines on the above are not for the experienced, but, on the other hand, for the inexperienced; it is on well-lighted heads that I am about to deal. To get softness and the proper amount of light and shade depicted without the aid of retouching requires practice and taste, we all are aware. Light the person so as to allow the ridge of the nose to be the lightest portion; allow your light to fall on the sitter at about an angle of 45°; use a tissue paper or white muslin head-screen—the latter, of course, being the most serviceable. The head-screen can be attached to the head-rest, and can be lowered or raised to get the best effect; it has a wonderful influence in softening the light overhead. Of course it must be moved out of the range of the portrait. Likewise use a side-screen (mine is covered with blue calico, the dead colour being outside, which I find gives me exceedingly soft shades). Follow these rules, and very little retouching will be required, providing your bath and chemicals work harmoniously. What is more abominable than to see false lights put in as we often do? Again, we must remember that we are sacrificing the likeness by doing so. Again, what is more beautiful than to see the true light and shade depicted with the truthfulness of the portrait? We all know that diffused light plays the greatest part in the photographic image, and reflected light the least; therefore it behoves us to use the reflectors as carefully as possible. If these rules are followed the head ought to stand well out from the background, showing roundness and fulness, and be one mass of light and shade softening into one harmonious whole, with the exception of the high-light along the nose, and a little patch of light to show fulness of the forehead with the receding side of deeper shade, which does away with all flatness, and makes the portrait pleasing and life-like to the eye.

A. CLARKE, JUN.

Bangor.

PRIMITIVE RETOUCHING.

SIR,—In reply to a few questions I asked in the NEWS some time ago, relative to retouching, I was favoured with a series of interesting and elaborate articles from the pen of Mr. Norman May, which proclaimed the gentleman to be thoroughly conversant with that art; yet—if I may be so bold as to say so—I could not but fear that, should any unlucky amateur (young in the mysteries of our art) become too suddenly aware of the huge array of "necessities" therein proclaimed requisite for retouching alone, he would immediately die of spontaneous combustion, commit suicide, or, taking the most hopeful view of his case, he would certainly at once and for ever renounce everything connected with photography. I might except, perhaps, his dreams, which would, I have no doubt, be fraught with scenes wherein he was pounced by innumerable stumps, swallowed by hosts of cuttle-fish, or, may be, coated with spirits of turpentine, then rolled in powdered blacklead. Or his visions might take a more sublime turn, and, borrowing the "wings" of his face, he might soar to scenes made bright by the light on the eye," and his soul being "touched" with the surrounding beauties, who knows but he might, in his ambition, long to become a retouching pencil, and strive to "spot out" the stars?

With all due respect to Mr. May, who, I understand, explained to us all he knew of retouching, and not all he practised, I consider that when such a variety of articles is deemed essential to make a picture, it is either a fresh negative or manipulator that is required. I have patiently waded through the ocean of mixtures at various times recommended, including shellacs, Canada balsam, resin, cuttle-fish, gum arabic, gum dammar, and various other gums, but I have found that these compounds required a greater proportion of "gumption" than any of them contained; and as I did not feel competent to supply that article to the extent necessary, I invariably returned to my primitive starting point, and, at last, in despair of finding anything better, I gave more attention to the condition of the negative varnish. I found that best results were always to be obtained when this was near the bottom of the bottle, and consequently thickest, so I purchased some treacle-like painters' white hard varnish, and diluted it until about twice the consistency of that mostly used by photographers. This I have used ever since, and with an ordinary Faber's H or HB pencil, I obtain most satisfactory results, and experience a feeling of contentment, while retouching, that I have hitherto not felt; in fact, I feel quite enthusiastic in its favour, and hail it as a haven of rest after being so long tossed about upon the troubled waters of compounds.

We generally find the pencil yield too light a touch upon the varnish film alone, unless, indeed, we press on so heavily that we are kept constantly upon the verge of lunacy by the frequent breaking off of the lead. With the spiritual agency, however, that I "summons to mine aid," no such troubles arise, nor, indeed, do ghosts either. I may state, for the re-assurance of my too literal readers, that the soft bed formed by the thickness of this varnish, while being still hard enough to refrain from producing the smallest amount of injury by its adhesiveness, yet seems to absorb the pencil, and allow of a variety in the strength of touch that is truly pleasant. So simple a plan as this must surely be known and worked by many photographers. Still, I do not ask forgiveness for alluding to it; rather is it slightly to their discredit for not giving the subject ventilation through the pages of the News, which are ever so kindly placed at our service for that and similar purposes. And surely the silent blessings of their less fortunate brethren would have been sufficient compensation for the trouble, if trouble it can be called, of making the method known.

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* Besides the well known fact that the compounds of the halogens with the metals have a considerable effect in producing a more or less liquid collodion, it is probable that in the case under consideration the quality of the pyroxyline is a factor of some importance.—Editor of the *Photographische Correspondenz.*

It may be thought that its very simplicity has caused it to be ignored, as many persons consider that nothing can be really good without it owns a large amount of complication. Thus they endeavonr to improve upon the primitive with something that contains an evil; then, instead of returning to their starting point, and branching off in another direction, always keeping within a certain radius, they endeavour to correct the "something" with another obnoxious decoction, which, in turn, requires regulating; and this proceeding is too often continued until we obtain these undesirable mixtures like the printing bath of old, when nit. of potash, nit. mag., and some half dozen more ingredients were introduced, each one to check some action of the other.

I will not now transgress further upon the patience of my readers, but, with the leave of our indulgent Editor, I should like shortly to dedicate a few words to the manipulation of negatives. Lyddell Sawyer.

SENDING NEGATIVES THROUGH THE POST.

Dear Sir,—I wonder how all those ladies and gentlemen who advertise in your columns that they will retouch negatives giving entire satisfaction, &c., and asking for a negative upon which they may perform to be sent as a specimen, and promptly returned, have the said negatives sent? Surely, any one wishing to send a negative in order to see the kind of work done, does not make up a railway parcel of it. He would probably do what I, in my innocence, did; viz., carefully pack it up in sawdust and paper, enclosing the whole in a small wooden box, address it, and write "glass" on the outside, and pay the full postal charge, and look out in the course of a couple of posts to see the parcel come back. And, no doubt, all would go well if you only refrain from writing "glass" on the outside. Doing that puts the Post Office officials in a frightful state of alarm; they seize the parcel, open it as though it were an infernal machine, and examine the contents. In my case the seizure and subsequent opening simply discovered the picture of a most unassuming young man, with no hair on his face, and altogether mild and inoffensive in appearance. But mark the result. After waiting several weeks, and writing for information (none of which, by the way, was given), I ultimately get a letter "On Her Majesty's Service," saying the parcel addressed so-and-so is in the hands of the Post Office officials. I am further informed that I have no right to send through the post anything whereby the safety of the "department" is imperilled, or anything that may cause danger to the officials or to the contents of the mail bags. All this upon a printed form; but interlined in writing I am given to understand that I am at liberty to recover this dangerous parcel by payment of so much registration fee, and by personally calling for same. What does it all mean? Had I left out writing "glass" upon the direction, it would have gone all right. Or does it mean that I ought to have registered the "dangerous" parcel? I can't say. The only thing of which I have anything like direct knowledge is, that if you label a parcel going by rail "glass, with care," that is the sign for the contents to be smashed. Pay the full postal charge on a negative carefully packed, and with "glass" written on the outside, and that is the sign for the officials to seize and open the same, keeping it about for sundry weeks, and, just when you have come to the conclusion that the whole thing is lost, you get a notice saying you can have your parcel back by personally calling for it, and paying for the privilege. Surely the ways of the Post Office people are past finding out.—I am, dear sir, your obedient servant,

J. B. C.

[It is probable, as our correspondent supposes, that if he had not written the word "glass" outside his parcel, it would have been delivered in due course. But as glass is one of the prohibited articles which postmasters are enjoined to examine and detain, he invited the scrutiny and detention. See *British Postal Guide.*—Ed.]

PERMANENCY IN SILVER PRINTS.

Dear Sir,—I heartily agree with Huffel and Co. in trying to rouse up the fraternity in the profession. What a grand thing it would be for silver prints to be made permanent. Let us all, then, put our minds to it. It is not so long ago that one of our cleverest amateurs promised to peer into the matter, namely, Captain Abney. Like Huffel and Co., I am likewise a great admirer of silver prints.—Yours truly, A. Clarke, Jun.

Bangor, May 17, 1878.

[Silver prints may be made more durable by exercising care and precision with known methods. We think it is mischievous to hope for some recondite method of securing permanency. But remember, that so long as silver spoons tarnish, so long will silver prints be liable to change by the action of various forms of atmospheric agency.—Ed.]

CHARACTER OF EMPLOYERS.

Dear Sir,—I consider it a good proposal of "A Photographer" that employers should furnish to applicants for situations a specimen of the class of work they wish for, also carte of self, and any particulars likely to prevent mutual disappointment.

I once travelled a great distance, and found I was expected to produce good work under a cucumber light. A hole had been pushed through the top of an attic, and the light placed thereon. This occurred in a first-class town, and about the last place one would be likely to expect to meet with such a patent arrangement.

An acquaintance of mine, a few days ago, was brought from a distance, and on arrival at his destination informed, with the greatest coolness, that the situation was filled: this was a case of great hardship.

I do not agree with "Photographer" that the best pay and treatment are to be had from the leading houses. In my experience, the middle-class photographers, and those who have added photography to another business, are always better to deal with, and more willing to accord some little credit to an assistant for any good work he may do.—I am, dear sir, yours truly, An Operator.

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Proceedings of Societies.

Manchester Photographic Society.

The last meeting before the usual summer recess was held at the Memorial Hall, on Thursday evening, the 9th inst.,—Mr. A. Brothers, F.R.A.S., President, in the chair.

The minutes having been disposed of,

The **President** said it was in contemplation to have an exhibition of photographs in conjunction with the coming exhibition of paintings, &c., at Peel Park, in August next, and requested contributions from the members of the Society.

The **Secretary** laid the *Bulletins* of the Belgian Photographic Society on the table.

Mr. **Lund** showed some prints on Durand's paper, printed by himself (Mr. Lund) in December last, and toned on the 5th May. The tones were satisfactory.

Mr. **W. J. Chadwick** exhibited a pair of lanterns of new design, one feature of which was that they had no chimney. He (Mr. Chadwick) also exhibited a new oxygen retort.

The meeting, which was well attended for the season, was then adjourned.

Photographic Society in St. Petersburg.

At the second meeting of the Photographic Section of the Imperial Polytechnical Society, which took place on Friday, May 10, Mons. Levitsky read a paper upon his "Experience with Herr Warnerke's Emulsion." His opinion was that the process required a great deal of practice in the development of the picture, and although Herr Warnerke seemed to use the solutions like toys, still it was only by long experience that he could do so with such precision. This difficulty would no doubt prevent any but amateurs from availing themselves of the emulsion process as it now stood. Mons. Levitsky also showed a negative of himself taken by Herr Warnerke, which he stated had become more intense, and gave harder prints than when it was first taken; this he was at a loss to account for, as it was fixed with cyanide of potassium.

The Committee then reported the results of the trial of emulsion plates at Herr Clasen's. The plates were prepared in their presence with an emulsion made by Herr Clasen, and were developed with ordinary iron developer almost as quick as in the ordinary wet process; the negatives, which were very good, were exposed simultaneously with plates prepared with Herr Warnerke's emulsion, the former ninety and thirty seconds, the latter eight minutes and three-quarter minutes respectively. In using his emulsion in a wet state, Herr Clasen dips the exposed plate into a weak negative bath previous to developing. This, he said, was not necessary for the dry plates.

Some prints, 9 by 6, were handed round for inspection, from a negative taken in Mons. Denier's studio, on the 23rd ultimo, of a group of ten persons placed at distances varying from four to ten paces from the camera (time, twenty-five seconds, slightly over-exposed). The lens used was a 2″ portrait, supplied with Mons. Baldrieff's invention for increasing the perspective power of lenses without sensibly reducing their rapidity (a patent is being applied for). The print was quite a marvel, the figures in the last plan being quite as sharp as those in the foreground, and perfectly free from distortion.

The President, Gen. Birkin, brought for inspection a fine collection of splendid views, 12 by 8, taken by himself, of Kiev and its neighbourhood, which elicited general admiration from those present.

The Secretary, Mons. Srezneffsky, informed the members that the Committee had agreed to subscribe for the following journals and annuals:—*Photographic News, British Journal, Photographic Journal, Philadelphia Photographer, Bulletin de la Societe Francaise, Journal de Photographie, Bulletin de l'Association Belge, Year-Book of Photography, British Journal Almanac, Photo Mosaics, Annuaire du Journal de Photographie, Photographisches Jahrbuch.*

Talk in the Studio.

Rapid Dry Plates.—Mr. W. Wainwright, jun., writes to say that the gelatine emulsion negative he showed at the last Photographic meeting was from emulsion prepared by Bennett's formula by Mr. Mawdesly.

New Foreign Photographic Society.—M. C. Chesterman is good enough to forward us intimation of the formation of a new society in St. Petersburgh, devoted to photography and its applications, and sends us items of its proceedings, which will be found on another page.

An Unsatisfactory Re-sitting.—A Newburyport paper says that a photographer, who had a fussy customer the other day, tried a trick of the craft upon her by going through all the motions without any plate in the camera, and then showing the victim one of the proofs of a former sitting, a plan which very often works satisfactorily, but in this case with no very great success. "I think that's one of my first pictures," says the lady. "I guess not," replied the picture man; "I could hardly have misplaced them." "Oh! but I know it is," replied the positive original; "I've changed my necktie since that one was taken." The artist subsided.

To Correspondents.

A. F. P.—The matt-silver stains of which you complain are old and familiar troubles to the photographer, common in warm weather. The chief cause is the character of the collodion, which you will find is horny and repellent. A soft, spongy film absorbs a good proportion of solution, and keeps moist; whilst the horny repellent film behaves quite oppositely: the solution on the surface, instead of flowing in an even wave, collects in little pools and streams, and these, becoming condensed by evaporation, deposit stains of matt metallic silver the moment the developer touches them. The best remedy is a change or modification of the collodion. When the collodion gets riper, you will get rid of the trouble. Adding a portion of a very ripe, powdery collodion is a good plan. Sometimes the addition of a drop or two of distilled water to an ounce of collodion, and shaking well, answers. Keep the inner frames of the dark slide quite clean, and place clean wet blotting-paper at the back of the plate. Finally, if the trouble is persistent, make a ten-grain solution of nitrate of silver, and give the plate a momentary dip in this before development.

Silhouette should know that we cannot repeat for individual instruction the details of processes which have often appeared in our pages. Silver printing by development is almost obsolete, but when it was occasionally used, many articles describing various methods appeared in our pages. In almost all cases, even the best developed prints had a flat, sunken, dull effect, which, in the present day, would not be tolerated. Hence it is little practised and little discussed. If you wish to try it, we may repeat formulæ which have given us pretty good results. Use thin, hard-surfaced English paper, and salt with chloride of sodium 20 grains, bromide of potassium 4 grains, distilled water 4 ounces, and lemon juice 4 drops. Immerse the paper until well saturated, and hang up to dry. Float on a 30-grain silver bath containing 2 drachms of lemon juice in a pint. Dry and use, printing until a faint image is seen. Make the print into a dish, and develop with a saturated solution of gallic acid. Wash very thoroughly, and fix in hypo. As regards ferrotype, we have given many articles recently, both in the News and Year-Books.

A. Clarke.—If the varnish be a spirit varnish, add, to thin it, methylated spirit. If it be made with a soft, tacky gum resin, nothing will prevent its being tacky A negative varnish should be made of a hard gum resin, which will not become tacky.

Pyro.—Take your transparency on a plate of glass, using a tough collodion. Immerse the fixed and washed plate in a dish of water containing about ten grains of citric acid to an ounce. In a short time the film will float loose. Wash it carefully in several changes of water, and then lift it by the aid of a camel's-hair pencil, and place it in position on the globe, which should have been treated first with a five-grain solution of gelatine. By the use of a little skill in manipulation, and the aid of the camel's-hair pencil, the film may be fixed neatly on the opal globe, and dry there satisfactorily.

A. J. F.—There is really no method of eliminating hyposulphite from prints more efficient than thorough washing. After washing in several changes of water, collect the prints into a heap, and subject them to heavy pressure to remove all the water. Then separate them, laying them one by one into a dish of clean water, and after again giving them several changes, repeat the operation. Hart's method consists in immersing the prints, after they have been washed for a while, in a solution of hypochlorite of soda. This oxydizes the hypo, and converts it into sulphate of soda. The prints are apt to be slightly bleached in the operation. The lead salt to which you refer is the acetate. It is not Hart's method. You will find details in our volume for 1874.

A. Ward.—We have published many methods of placing a photograph on wood for the use of the engraver, but we cannot tell the special one to which you refer. The best method is to proceed as in photo-lithography, and produce a photo-lithographic transfer, and rub it down on the surface of the wood. By this means you get the image on the wood without any film of collodion, albumen, &c., which would chip up in cutting.

S. R. M.—The reproduction of negatives by means of powdered graphite and bichromated dextrine was introduced by M. Obernetter. His article appears on p. 147 of our Volume for 1874. You will also find an article on the subject in our Year-Book for 1875, on p. 121.

E. Williams.—Many thanks for the interesting photographs.

Lyddell Sawyer.—Thanks. We shall have pleasure in receiving the further communication.

Several Correspondents in our next.

The Photographic News, May 31, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Visit to the Paris Exhibition.

[BY OUR SPECIAL CORRESPONDENT.]

The world's show at Paris is likely to attract, for the simple reason that one wants but the slightest excuse for visiting the gay city. Although the Exhibition is hardly finished, and scarcely a month has elapsed since its opening, the French metropolis is filled with sight-seers to overflowing. At the restaurants on the Boulevards and in the Palais Royal there is, during the breakfast and dinner hours, a packed crowd of hungry visitors; and at such houses as the "Maison Dorée," where the diners are usually more select than numerous, you have to look about for a vacant table if you leave dining to the fashionable hour of seven. As to hotels, I can say very little. People tell me they are full to overcrowding, and my experience, which is limited to a quiet hostelry under shadow of the Institute, and, therefore, in the unfashionable quarter, would bear this out. I wrote exactly one week before I started, and specified day and hour of my arrival, and in reply was promised a bed in or out of the house. Fortunately for myself I obtained the former, but had to decide upon the length of my visit off-hand. No doubt there is plenty of room if one only knew where to find it, but in these times you like to know something of cost and finance before venturing too far.

Paris, however, is not the only place where prices of beds are high. Only last year I had to pay a sovereign a-piece for three beds for the night at Düsseldorf, the cheapest manufacturing town in Germany, in all probability; in case my friend Dr. Liesegang should desire to try the house I shall be happy to give him the address. So I cannot grumble at Paris. Indeed, when you have secured your bed, you can control your other items of expense as you will in Paris. The Exposition has caused restaurateurs to add twenty-five per cent. to their prices, and the refreshments at the Exhibition itself are costly; but you go everywhere with your eyes open. And the show at Paris is well worth something. The shops, the people, the cafés, the markets, the bonnes, the roundabouts, the smell of asphalte, the yellow omnibuses, the *grands magasins* where you can buy from a sou to a sovereign, the Champs Elysées, the puppet-shows, the white caps, the baggy red trousers of the soldiers, the high-heeled shoes and clocked stockings, the goldsmiths in the Palais Royal, and the asparagus and salmon in the same locality, the chatter of children who speak French perfectly, the horse-hair plumes of the sapeurs-pompiers—all these can be seen and seen again. As the poet sings very truly:—

"The Continong, the Continong,
It is tres bong, pour passer le tong,
Where we says yes, and they says nong,
Allez vous ong, mes bons enfongs,
We all will do the Continong,
It is tres bong—je vous comprong."

I do not know who the poet was, but, judging from *je vous comprends* at the end, one cannot help thinking that Paul Bedford's "I believe you, my boy!" had something to do with it.

But it is the Exposition and the photographs exhibited there which your readers care more about. I am at their service. But, before I forget it, there is one thing I should like to mention, more important than anything I have seen on the Champs de Mars or Trocadero. Everybody is aware of the fuss that has lately been made about electric lighting. We have all of us in our time seen the electric spark thus employed—a vivid spark that no one can look at, a narrow beam or ray which lights up everything in its path with dazzling brilliancy, and throws all the rest in pitchy darkness, whose illumination is painfully sharp, and shadows are obscure and black. This phenomenon, I say, we are all acquainted with, as well as the arguments employed to show us that electricity will never be any good for everyday lighting purposes. What was my surprise, then, the other night to see at the Louvre hotel and magasin, among a multitude of gas globes, several gigantic moons, soft and placid to look at, emitting something of a mauve light. It was not the light of day, but the effect of moonlight that was here, an effect both charming and grateful to the eye. The effect was at its best in the courtyard of the Louvre hotel. An open space smoothly asphalted, and surrounded by shrubs, on one side of which was a broad, open staircase, and the other a café *al fresco*, was lit up by no less than eight monster globes provided with the electric light. Carriages drove in and out, people sauntered to and fro, all in the light, apparently, of a full moon, with the exception, however, that there were no black shadows; indeed, there were no defined shadows at all, the light was so thoroughly diffused. In the Louvre magasin—probably the largest shop in the world—the electric globes were again to be seen, and the gas in the vicinity had scarcely any yellowness, so well in hand was the electric lighting.

Surely we have here the solution of that problem for which we have been working for years—electric lighting applied to everyday uses, not as a wonder of the age, an example of scientific application, but as a genuinely useful everyday commodity. The system of electric lighting at the Louvre, I am told, is all due to one set of engines, which simply sets in motion a huge magneto-electric machine, and grinds out the electricity. Given the apparatus and the steam-engine, it is simply necessary to work the latter fast or slow to ensure a large or small amount of electricity and light. There is no heat and no noxious vapour given off, as in the case of gas, and the only consumption of material worth talking about is that employed for working the steam engine.

And now for the Exhibition and photography. I have kept them a long time waiting, and the only apology I can offer is that, so far as the photographic section is concerned, it cannot possibly suffer from the process. In the vast oblong of courts and corridors there is, in the centre of the building, Group 2, Class 2—*Photographie*. It belongs to the division *Art Applique a l'Industrie*. Only France and its colonies are here represented, and the effect upon a visitor after he has made his round is one of profound disappointment. Perhaps I expected too much. Possibly I thought of discovering an Adam-Salomon this time, as on the last occasion. I hardly know, except that I certainly did anticipate a better show than is here provided.

The year before last I visited the Exhibition of the *Societe Francaise de la Photographie* at the *Palais de l'Industrie*. The collection of work was far more carefully selected and worth seeing on that occasion than in the present case. I should think, too, there were many more French exhibitors than this year. I think I can safely say there is not a single novelty on the present occasion (I speak only of the French section, please to remember, for I have seen nothing else so far), except, perhaps, the large enamel pictures (twelve-inch) shown by Walery, and the vignetted portraits—I presume, on glass—by Lejeune. The latter are certainly very fine. They are vignettes on a jet-black background, some being of large dimensions. They possess all the rare softness and finish of positives taken upon glass; and the delicacy of the white drapery and harmony of the whole portrait upon the shining black ground is very perfect. Such portraits are very effective, and should not be difficult to produce; they certainly have a novel effect now positives on glass have gone out, and they have none of that dull leadenness which ferrotypes display in the high lights.

Besides Walery's large enamels, which are really very fine, our old friend Lafon de Camarsac shows also productions in the same branch of photography. As before, his work is excellent, and a portrait of the Comte de Paris especially good. But whether he has already achieved perfection, and can no further go, it is certain that there is nothing but what we have seen before. Some good enamels are also shown by Mathieu-Deroche.

The pictures are not fairly hung, half of them enjoying good and the other half bad light. Reutlinger sends some charming examples of portraiture—a likeness of the head of the firm being prominent—but they are not better than what we have seen already. Klary, of Algiers, is represented by some fine work, but the collection is not so extensive as that in the London exhibition last autumn Bacard and Delié (late Disderi) exhibit portraits of fair excellence, and M. Delton, of the Bois de Boulogne, shows a collection of clever equestrian studies. M. Liebert, whose name is well known as a Paris photographer, makes a speciality of carbon enlargements, but I failed to see anything particular in his exhibits, and the same may be said of work of the same kind by Numa Blanc.

M. Chambray seems to be as successful in the depiction of infantile portraits as our own Mr. Faulkner; he shows a charming selection of little models charmingly expressed and deftly posed. If I compare M. Franck with Valentine Blanchard again, I am saying a good deal for the former's work; he indulges in large work something after the style of Adam-Salomon, but lacks something of the master's ability.

Of course M. Leon Vidal is represented, but he has nothing new to show, and the same may be said of those who, like MM. Jeanrenaud and Gillot, show something of mechanical printing. The *Societe Francaise* has an historical frame, representing the progress of the art from a plate by Nicephore Niepce taken by the bitumen of Judea process in 1824, down to the fine moon photographs of Rutherfurd, of New York. The firm of Braun, of Dornach, shows some magnificent three-foot landscapes (carbon) of Swiss mountains and water-falls of a cold sepia tone, that cannot be sufficiently praised (? is not Alsace in Germany now). And finally, Jules Girard exhibits an interesting series of microphotographs to illustrate a study upon iodide of silver in collodion.

I will speak of the foreign photographs in the Exhibition in another letter.

COMPOSITE PORTRAITS.*

BY FRANCIS GALTON, F.R.S.†

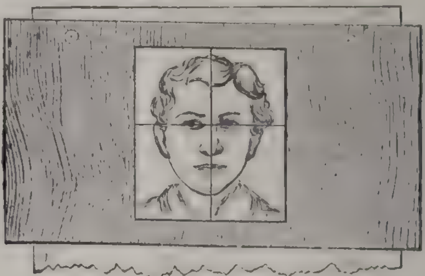
I submit to the Anthropological Institute my first results in carrying out a process that I suggested last August in my Presidential Address to the Anthropological Subsection of the British Association at Plymouth, in the following words:—

"Having obtained drawings or photographs of several persons alike in most respects, but differing in minor details, what sure method is there of extracting the typical characteristics from them? I may mention a plan which had occurred both to Mr. Herbert Spencer and myself, the principle of which is to superimpose optically the various drawings, and to accept the aggregate result. Mr. Spencer suggested to me, in conversation, that the drawings reduced to the same scale might be traced on separate pieces of transparent paper and secured one upon another, and then held between the eye and the light. I have attempted this with some success. My own idea was to throw faint images of the several portraits, in succession, upon the same sensitized photographic plate. I may add that it is perfectly easy to superimpose optically two portraits by means of a stereoscope, and that a person who is used to handle instruments will find a common double eyeglass fitted with stereoscopic lenses to be almost as effectual, and far handier, than the boxes sold in shops."

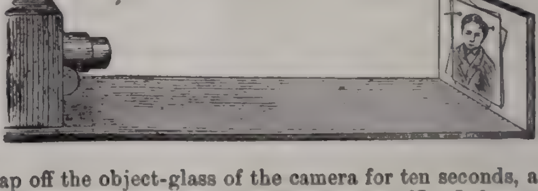
Mr. Spencer, as he informed me, had actually devised an instrument, many years ago, for tracing mechanically, longitudinal, transverse, and horizontal sections of heads on transparent paper, intending to superimpose them and to obtain an average result by transmitted light.

Since my Address was published, I have caused trials to be made, and have found, as a matter of fact, that the photographic process of which I there spoke enables us to obtain with mechanical precision a generalized picture; one that represents no man in particular, but portrays an imaginary figure possessing the average features of any given group of men. These ideal faces have a surprising air of reality. Nobody who glanced at one of them for the first time would doubt its being the likeness of a living person. Yet, as I have said, it is no such thing; it is the portrait of a type, and not of an individual.

I begin by collecting photographs of the persons with whom I propose to deal. They must be similar in attitude and size, but no exactness is necessary in either of these respects. Then by a simple contrivance I make two pin-holes in each of them, to enable me to hang them up one in front of the other, like a pack of cards, upon the same pair of pins, in such a way that the eyes of all the portraits shall be as nearly as possible superimposed; in which case the remainder of the features will also be superimposed nearly enough. These pinholes correspond to what are technically known to printers as "register marks." They are easily made; a slip of brass or card has an aperture cut out of its middle, and threads are stretched from opposite sides, making a cross.



Two small holes are drilled in the plate, one on either side of the aperture. The slip of brass is laid on the portrait with the aperture over its face. It is turned about until one of the cross threads cuts the pupils of both the eyes, and it is further adjusted until the other thread divides the interval between the pupils in two equal parts. Then it is held firmly, and a prick is made through each of the holes. The portraits being thus arranged, a photographic camera is directed upon them. Suppose there are eight portraits in the pack, and that, under existing circumstances, it would require an exposure of eighty seconds to give an exact photographic copy of any one of them. The general principle of proceeding is this, subject in practice to some variation of details, depending on the different brightness of the several portraits. We throw the image of each of the eight portraits in turn upon the same part of the sensitized plate for ten seconds. Thus, portrait No. 1 is in the front of the pack; we take the cap off the object-glass of the camera for ten seconds, and afterwards replace it. We then remove No. 1 from the pins, and No. 2 appears in the front; we take off the cap a second time for ten seconds, and again replace it. Next we remove No. 2, and No. 3 appears in the front, which



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* Made by combining those of many different persons into a single resultant figure.

† Read before the Anthropological Institute, April 30.

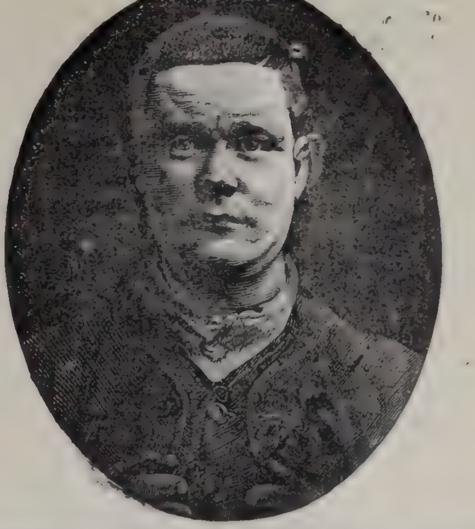
we treat as its predecessors, and so we go on to the last of the pack. The sensitized plate will now have had its total exposure of eighty seconds; it is then developed, and the print taken from it is the generalised picture of which I speak. It is a composite of eight component portraits. Those of its outlines are sharpest and darkest that are common to the largest number of the components; the purely individual peculiarities leave little or no visible trace. The latter being necessarily disposed equally on both sides of the average, the outline of the composite is the average of all the components. It is a band, and not a fine line, because the outlines of the components are seldom exactly superimposed. The band will be darkest in its middle whenever the component portraits have the same general type of features, and its breadth or amount of blur will measure the tendency of the components to deviate from the common type. This is so for the very same reason that the shot marks on a target are more thickly disposed near the bull's-eye than away from it, and in a greater degree as the marksmen are more skilful. All that has been said of the outlines is equally true as regards the shadows; the result being that the composite represents an average figure, whose lineaments have been softly drawn. The eyes come out with appropriate distinctness, owing to the mechanical conditions under which the components were hung.

A composite portrait represents the picture that would rise before the mind's eye of a man who had the gift of pictorial imagination in an exalted degree. But the imaginative power, even of the highest artists, is far from precise, and is so apt to be biased by special cases that may have struck their fancies, that no two artists agree in any of their typical forms. The merit of the photographic composite is its mechanical precision, being subject to no errors beyond those incidental to all photographic productions.

I submit several composites made for me by Mr. H. Reynolds. The first set of portraits are those of criminals convicted of murder, manslaughter, or robbery accompanied with violence. It will be observed that the features of the composites are much better looking than those of the components. The special villainous irregularities in the latter have disappeared, and the common humanity that underlies them has prevailed. They represent, not the criminal, but the man who is liable to fall into crime. All composites are better looking than their components, because the averaged portrait of many persons is free from the irregularities that variously blemish the looks of each of them. I selected these for my first trials because I happened to possess a large collection of photographs of criminals through the kindness of Sir Edmund Du Cane, the Director-General of Prisons, for the purpose of investigating criminal types. They were peculiarly adapted to my present purpose, being all made of about the same size, and taken in much the same attitudes. It was while endeavouring to elicit the principal criminal types by methods of optical superimposition of the portraits, such as I had frequently employed with maps and meteorological traces,* that the idea of composite figures first occurred to me.

The other set of composities are made from pairs of components. They are selected to show the extraordinary facility of combining almost any two faces whose proportions are in any way similar.

It will, I am sure, surprise most persons to see how well defined these composites are. When we deal with faces of the same type, the points of similarity far outnumber those of dissimilarity, and there is a much greater resemblance between faces generally than we, who turn our attention to individual differences, are apt to appreciate. A traveller, on his first arrival among people of a race very different to his own, thinks them closely alike, and a Hindu has much difficulty in distinguishing one Englishman from another.



The accompanying woodcut is as fair a representation of one of the composites as is practicable in ordinary printing. It was photographically transferred to the wood, and the engraver has used his best endeavour to translate the shades into line engraving. This composite is made out of only three components, and its three-fold origin is to be traced in the ears, and in the buttons to the vest. To the best of my judgment the original photograph is a very exact average of its components; not one feature in it appears identical with that of any one of them, but it contains a resemblance to all, and is not more like to one of them than to another. However, the judgment of the wood engraver is different. His rendering of the composite has made it exactly like one of its components, which, it must be borne in mind, he had never seen. It is just as though an artist drawing a child had produced a portrait closely resembling its deceased father, having overlooked an equally strong likeness to its deceased mother, which was apparent to its relatives. This is to me a most striking proof that the composite is a true combination. [I trust that the beauty of the woodcut will not be much diminished by the necessarily coarse process of newspaper printing.]

The fairness with which photographic composites represent their components is shown by six of the specimens. I wished to learn whether the order in which the components were photographed made any material difference in the result, so I had three of the portraits arranged successively in each of their six possible combinations. It will be observed that four at least of the six composites are closely alike. I should say that in each of this set the last of the three components was always allowed a longer exposure than the second, and the second than the first, but it is found better to allow an equal time to all of them.

The stereoscope, as I stated last August in my address at Plymouth, affords a very easy method of optically superimposing two portraits, and I have much pleasure in quoting the following letter, pointing out this fact as well as some other conclusions to which I also had arrived. The letter was kindly forwarded to me by Mr. Darwin; it is dated last November, and was written to him by Mr. A. L. Austin, from New Zealand, thus affording another of the many curious instances of two persons being independently engaged in the same novel inquiry at nearly the same time, and coming to similar results.

"*Invercargill, New Zealand, Nov.* 6, 1877.

"To Charles Darwin, Esq.

"Sir,—Although a perfect stranger to you, and living on the reverse side of the globe, I have taken the liberty of writing to you on a small discovery I have made in binocular vision in the stereoscope. I find by taking two ordinary carte-de-visite photos. of two different person's faces, the portraits being about the same sizes and looking about the same direction, and placing them in a stereoscope, the faces blend into one in a most remarkable manner, producing in the case of some ladies' portraits in every instance a *decided improvement* in beauty. The pictures were not taken in a binocular camera, and therefore do not stand out well, but by moving one or both until the eyes coincide in the stereoscope, the pictures blend perfectly. If taken in a binocular camera for the purpose, each person being taken on one half of the negative, I am sure the results would be still more striking. Perhaps something might be made of this in regard to the expression of emotions in man and the lower animals, &c. I have not time or opportunities to make experiments, but it seems to me something might be made of this by photographing the faces of different animals, different races of mankind, &c. I think a stereoscopic view of one of the ape tribe and some low caste human face would make a very curious mixture; also in the matter of crossing of animals and the resulting offspring. It seems to me something also might result in photos. of husband and wife and children, &c. In any case, the results are curious if it leads to nothing else. Should this come to anything you will no doubt acknowledge myself as suggesting the experiment, and perhaps send me some of the results. If not likely to come to anything, a reply would much oblige me.—Yours very truly,

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* "Conferance at the Loan Exhibition of Scientific Instruments," 1878. Chapman and Hall. Physical Geography Section, p. 312, "On Means of Combining Various Data in Maps and Diagrams," by Francis Galton, F.R.S.

"A. L. Austin, C.E., F.R.A.S."

To be continued.

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PHOTOGRAPHY AT THE LEAST REFRANGIBLE END OF THE SPECTRUM, AND ON SOME PHOTOGRAPHIC PHENOMENA.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

Now as to the process by which the negatives were taken, I hardly know what to say. The process is the ordinary collodio-bromide process, made with zinc and excess of silver nitrate, as I have already published. This, in the ordinary way of making, possesses an orange tint by transmitted light, and is in this state wholly insensitive to the red rays, at least to those below B. If to some of this emulsion we add water, and very slowly distil over the solvents, rinse with alcohol, and then re-emulsify, we shall find that we have a film which is totally different in quality and appearance. The film will be much more powdery, if I may use the expression—the nature of the pyroxyline being altered, and a film showing blue light by transmission.

It is not every blue transmitting emulsion, however, which is sensitive to red rays (some are insensitive to either the red or the blue), but if you get a film which is purplish in appearance, you will probably have a film which is sensitive to both the red and the blue.

The details of the process with the modifications I, however, reserve to another occasion.

I must, however, point out the principles which have guided me in my researches. They may be briefly stated to be, to find a sensitive salt which will absorb the rays in the portion of the spectrum which it is endeavoured to photograph. In the present day it is scarcely necessary for me to point out that absorption by any body indicates that work of some kind must be done in that body, either by separating the molecules of a body further from one another, or by the disintegration of the molecules themselves. In the first case, we have heat developed, and in the last we have chemical action, producing what may may be a developable compound. Now, in order that the red rays may affect a compound chemically, they must absorb it, and by getting a blue film we get the desideratum. As you are aware, at first I obtained this by adding resins to the bromide, and thus effecting what I call a weighting of the molecules. In the last process, the bromide itself or its hydrate weights them, and makes them swing in accordance with the red waves, and thereby absorbs them. If the pyroxyline be of the character to obstruct what are called the dark heat waves, we cannot expect to get much action of the spectrum on the sensitive compound occluded in it, and experiment serves to show that a horny collodion is not transparent in these heat rays, and is, therefore, not easily affected by the ultra red. A powdery pyroxyline, on the other hand, seems to be diathermous, and with a collodion made with it we have an effect in the ultra red, if the sensitive compound be absorbent of these rays.

Vogel found, if a bromide film was slightly dyed, that it became in some cases sensitive to the rays the dye absorbed, and in one paper seemed to indicate that it is the dye *per se* which is effective. My own experiments show that the dyes (much or little of them) only have effect when combined with silver, as I published in May, 1876, and I believe that Dr. Vogel found the same thing. The question, then, resolves itself into this: How is it that when the minimum quantity of dye is added to a film in which there is free silver that an image can be developed? The answer is easy: The compound of silver and dye is changed by light, and I have already shown that a film that is totally unacted upon by light may be developed by placing it in contact with one which has received an image; the changed organic compound of silver is in close contact with the bromide, and the image impressed on the dye is thus developed on the bromide silver.

When there is not sufficient silver nitrate in the film to combine with the dye (always supposing the dye will combine with the silver, which is the only case in which the employment of dyes have proved effective), the excess of dye acts very much in the same way that free bromide acts on an ordinary emulsion plate, and prevents the impression of an image, the reduced compound being immediately reconverted into the normal undevelopable compound. The case of eosin is very much to the point, as it is an organic bromide. When combined with silver it is easily reduced by the light it absorbs, but if an excess of it be present, this is reconverted into the normal salt. I may call your attention to the possibility of the existence of different weights of molecules. Faraday found that gold leaf, which is green by transmitted light, when heated became red, and remained so. If the red molecular gold were rubbed with an agate or other hard body, it would return to its green molecular form. In the same way when we rub the film of silver bromide which transmits the blue, we get the form which transmits the orange light. I venture to prophesy that the science of chemistry is on a fair way to be firmly mated with molecular physics, and the two combined will before long take a greater bound in advance than they have done as yet.

I now come to the second part of the subject which I have to bring before the Society, and I have brought it forward as it has an intimate bearing on the success of red end photography, so much so that I am in hopes of obtaining results in a much more expeditious manner than I have done at present, as soon as my new apparatus is fitted up. It will be remembered that I brought before the Society last year a paper on the destruction of the photographic image by means of various oxidising agencies, and I concluded a communication to the *Philosophical Magazine* by stating that if the red rays should prove to be accelerators of oxidizing action, that then we should have an explanation of the reversing action of the red rays as recorded by Draper, and probably also an explanation of photography in natural colours as shown by Becquerel and Niepce de St. Victor. Into the latter I do not wish to enter to-night, as my investigations are incomplete, though I may say I have succeeded in producing the spectrum in its natural colours by similar means in a very short time. I have already announced at the Royal Society that I find the red rays and ultra-red rays are accelerators of oxidation. I will briefly give an outline of the experiments carried out. Plates were prepared with what I will call red end emulsion, and exposed to diffused light for two or three seconds, and then immersed in one or other of the following oxidizing solutions:—Potassium permanganate, potassium bichromate, nitric acid or hydroxyl.

The solutions were very weak indeed. Take, for example, nitric acid—five or six drops of concentrated nitric acid in four ounces of water. Whilst thus immersed, the plate was exposed to the action of the spectrum for about seven minutes, when on development it was found that the red rays had not only stopped the reducing action of the light, but had cleared away the fog from the plates where the red light had acted, leaving the Fraunhoffer lines as opaque lines on a transparent background, instead of transparent lines on an opaque background. Such a photograph I now show. To test the matter further, it occurred to me that if the solutions were further diluted, the oxidizing action ought to be more balanced by the reducing action, both being at work at the same time. This proved to be the case. The photograph now shown was obtained under precisely similar circumstances, with the single exception that the oxidizing solution was reduced to half the strength. Iodide and bromo-iodide of silver films behaved in precisely the same way. These were washed first, then exposed in the solution, and developed with pyrogallic acid and silver. By a singular mistake, a plate of bromo-iodide of silver was placed outside the cell next the spectrum, instead of in the cell, and exposed to the spectrum; in this case *the same results were obtained*, showing that, in a film on which the red rays have no reducing effect, the oxidizing action is effective, even where no special means are taken to help the oxidation. I wish you to note, however, that this last experiment, when combined with the fact that, at will, on a film of silver bromide, a reversed or non-reversed negative can be obtained, shows that, in all photography of the rays of low refrangibility, we have a powerful oxidizing accelerator to contend with; and further, that unless the sensitive salt employed be one in which the reducing action more than counterbalances the oxidizing action of the oxygen in the air, together with its acceleration by the red rays, a non-reversed negative of this portion of the spectrum is impossible. This being so, it is obvious that, if you exclude all oxygen, the negative should be obtained more readily. This is what I am at present trying, and shall be able to speak more authoritatively on the matter on a future occasion. I may point out, however, that this at once explains the insensitiveness of the bath process with silver bromide for the red rays, the presence of nitric acid being necessary to obtain freedom from fog. By saying that the red rays are accelerators of oxidation, I do not mean to say that the other rays, such as the blue, are not equally so—in fact, they are; but their reducing action is far greater than their acceleration of oxidization. If, however, all the silver salt accessible to the light (of which there is not a very large proportion in comparison with the volume employed) be reduced, then the oxidizing action at once takes place, and the image is destroyed, and we get what is known as solarization, a phenomenon well known. Here I have a photograph of a spectrum, in which the oxidizing action takes place in the blue as well as in the red. There is one experiment I have seen noted in Hunt's "Researches on Light," which bears upon this subject. Hunt exposed silver chloride in the closed end of a bent tube to light, the other end dipping in water. He remarked that after some days' exposure to light, the water rose in the tube; from this he inferred that, since the water would absorb the chlorine, the altered silver chloride must absorb oxygen; and so it did, but the experiment was not followed out. Now, it may be said, How do you know that oxidation takes place? Well, a simple experiment will show. Take a film of silver bromide, and expose it to light till it darkens all over, and then drop on it a little peroxide of hydrogen, potassium bichromate, or permanganate, and let the drops remain on a short time, and then wash the film; there will appear to be but very little alteration in the colour, if any. Pour over it sodium hyposulphite, and it will be seen that, where the drops have rested, the film is quite clean and bright, whereas, over the rest of the plate is a very thin film of (presumably) silver.

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* Continued from page 244.

I could detail other experiments, but I am afraid I shall weary you out, so I now conclude, with a hope that what I have detailed may be of interest not only to this Society, but to the scientific community at large. I must acknowledge the great assistance I have received in these latter researches from Corporal Davenport, R.E., without whose aid my experiments must have been more prolonged than they have been.

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THE RADIOMETER AS A MEANS OF DETERMINING TIME OF EXPOSURE IN THE STUDIO.

BY C. BELLACH.*

It is probably the wish of every thinking photographer to obtain a measure with which to determine the amount of light passing through a skylight, because it happens that in most studios the light is either weak on account of poor situation, or because of the exposed position is very energetic. In both cases it will be very difficult to obtain the correct time of exposure, and will require a long time to acquire the experience for judging. And even then, in many cases, it will happen, on account of changing light, that the negative will be either over or under-exposed.

If we should look into various studios we should find that no two operators measure the light in one and the same way, that is to say, by a fixed rule. One will slowly count from one to ten at one time, which he thinks correct, and covers the lens, saying to himself, "Now you have the exposure just right." Another counts from one to a hundred so fast that he can scarcely form the numbers with his lips; which he thinks, and, according to his way, is convinced, will give an exposure neither too short nor too long. But if the negative be under-exposed, will he, on the second trial, count one hundred and more? He counts the hundred, and waits a little while, and then puts the cap on the lens without having any idea how much time, either more or less, that he has waited (this is from personal observation). Another will measure the correct time in seconds, and count to himself during the exposure. It happens, after a fashion, that when busy, other thoughts will slip in during the counting, when the before-determined-on amount of time will slip by; moreover, one can hardly ever be positive that he counted off a sufficient number of seconds. In general, it would be well, in exposing, to use a watch marking seconds, which will give us the time determined on with sufficient accuracy. But the correct exposure can be hit upon only in an unchanging light. By a changing light—and it always changes the whole day—we must continually be changing the length of exposure. It is not very long since Prof. William Crookes, of London, succeeded in making an instrument with which the amont of light can be shown. I refer to the radiometer or light mill. If it is placed in the light, the wings, arranged in a cross, will rotate, the faster as the light is stronger. I use this instrument to measure light for exposures in the following manner. An exposure is made in the uasual way, timing it by the requisite number of seconds on a watch, at the same time observing the radiometer placed at some convenient point in the studio, and count the number of revolutions of the wings. For example, I make an exposure which is right, the negative is good, the number of revolutions is five; I would then, with every other negative, at any time of day, in weak or in strong light, in the same way (that is, for the same size picture, and chemicals in the same condition) expose only during five revolutions of the radiometer. For various sizes of pictures and kinds of apparatus I would obtain a normal number in the same way.

Of the sensibility of the radiometer it will be noticed that heat without the accompanying light will set the wings in motion; it follows then that a heated stove, if near the radiometer, will have the same effect as light. So it is better to place it in a fit place, protected from this heat which can increase the working of the light.

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* *Deutsche Photographisches Zeitung.*

The Photographic News.

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COMBINATION PHOTOGRAPHY IN PORTRAITURE.

On another page we print a paper of extraordinary interest by Mr. Francis Galton, F.R.S., read before the Anthropological Institute, for copy of which we are indebted to the courtesy of the author. For the use of the engraved illustrations we are indebted to our contemporary *Nature*, where the paper was first printed. Photographers are familiar with certain forms of composite or combination photography, in which portions of different objects are combined to secure one pictorial whole. The clouds and sky of one scene are often added to the terrestrial portion of another. Foreground objects and figures are added to landscapes, and a variety of other objects are joined one to another in the combination photographs with which photographers are familiar, and this junction is generally effected in the process of printing. Combinations have also been occasionally effected in the camera in what has been termed the production of "doubles." In this case a portion of the sensitive plate is covered by a shutter inside the camera, whilst an image is obtained on the unscreened portion of the plate. This, then, is covered by another shutter whilst the sitter changes place, and is again photographed on the other portion of the plate, producing the grotesque effect of a man looking at himself. Occasionally we have seen combination portraits produced in this way; the lower features of one person being joined to the upper features of another. In this case the curious result followed of a portrait with no specific likeness to either of the sitters, but a portrait of a type of man similar to both, but the type was much intensified in the composite portrait. But Mr. Galton's composite portraits are different from any of these, and have a more definite purpose and result. In these portraits a negative is produced which is the resultant of the images of several faces of the same size superimposed, by which a generalization of the various components is secured. The result would be similar if half-a-dozen persons in succession sat before the camera for a few seconds, and partially impressed their portraits on the same plate. In point of fact, for the purposes of his experiments, Mr. Galton has obtained a number of card portraits in which the proportions are alike, and copied them, giving them a succesion of exposures with different portraits, one image upon another on the same plate. The final result is, as will be well understood, not specifically like any one individual, but is a combination of the characteristics of the whole.

This would be amusing and curious enough if it were undertaken by an idle man for mere pastime; but Mr. Galton finds in it a very material aid to the study of anthropological science. Such composite portraits produced with due care give strikingly characteristic renderings of races, or of temperaments, or of families. The first impression of photographers generally will be that the result of such superposition of different images will be simply confusion; and its indiscriminate application would doubtless be so. The fact is, however, far otherwise in Mr. Galton's examples, in which similar types are chosen for combination. The wood-cut example on another page will enable the reader to form some idea of the result of the superposition of three images in which the plurality of the ears and some buttons alone indicate the combined character of the portrait. The photograph itself from which the woodcut is taken is still more perfect. It certainly possesses a definite resemblance to all the component faces, and Mr. Galton thinks not more to one than another. To our eyes it bears a much stronger resemblance to one than to either of the other two, and, what is very singular, the engraver in the woodcut has made that resemblance much stronger than it is in the photograph, although he had never seen the original components at all.

In a paper read at Plymouth, before the British Association, Mr. Galton pointed out the value of the stereoscope in superposing two different portraits so as to present one image to the eye, and thus, by combining two examples, obtaining more marked rendering of a type. Many photographers are doubtless familiar with the effect of combining two different portraits in the stereoscope; but it has only occurred to the anthropological student to find a definite purpose and end in this. We have frequently combined two portraits of similar size of the same person in the stereoscope, and have been struck with the fact that, as a rule, the result was an improvement. Two dissimilar expressions, neither of them, probably, the fair or natural expression of the man, when combined presented a generalization much nearer in resemblance to the true man than was seen in either of the individual pictures. And this brings us to a point in Mr. Galton's paper of especial interest to portraitists. One of the uses of the process he suggests is to obtain by photography a really good likeness of a living person. "The inferiority," he observes, "of photographs to the best works of artists, so far as resemblance is concerned, lies in their catching no more than a single expression. If many photographs of a person were taken at different times, perhaps even years apart, their composite would possess that in which a single photograph is deficient." The superiority of the work of the great painter lies mainly in the fact that he studies his sitter, marking his varied flitting expressions, and gives in his portrait a generalization expressing the sum of all of them. The real face of the man is the product and resultant of many emotions, and the portraitist who possesses true insight endeavours to express this product. He studies to penetrate beyond the mask which is often presented for portraiture,

> "As when a painter, poring on a face
> Divinely through all hindrance, finds the man
> Behind him, and so paints him that his face
> Lives for his children ever at its best
> And fullest."

It is probable that the photographic composite, if produced with judgment and skill, might, in some cases, present a better generalization than the painter. It has been truly said that no man can put more into a painting than he possesses in himself. The generalization of the photographs will deal with facts as they are, whilst that of the painter can only deal with facts as he perceives them. In the generalization of a series of photographs the higher truth may be secured, eliminating altogether the personal equation. If the photographs be true and sufficiently varied, a valuable result may be secured. At any rate, a phase of the question is here presented well worthy of the consideration of portraitists.

Mr. Galton also suggests another interesting consideration as to how far more satisfactory portraits may be obtained of distinguished men of whom various portraits exist by different painters, each presenting some phase of character presented to them in painting. This might be done with some degree of accuracy without much trouble. Suppose six various portraits exist, let the first be focussed, and the size of the face carefully marked on the ground glass, marking also the position of the eyes. One-sixth of the total exposure being given, then proceed with the second, taking care that the image on the ground glass is accurately superposed on the preceding one, and so to the end. If the original portraits vary in size, the camera should be moved until an image of the precise size of the first be obtained. The completed negative would present a generalization of the whole, which would be interesting and instructive.

There is one technical point worthy of consideration by those who may accept Mr. Galton's invitation to experiment in this direction. It is generally found by portraitists who take a succession of portraits on different parts of the same plate that the last portions exposed require a somewhat shorter exposure than the preceding ones. This is probably dependant upon the fact that during the lapse of time any traces of unconverted bromide and iodide in the film are converted into bromide and iodide of silver at the expense of the free nitrate on the plate, and as the haloid salts, which are unconverted, act as retarders, when converted into salts of silver, the portion of the plate in question is practically more sensitive. An equal division of the full time of exposure will, therefore, fail to give an equal division of photographic action. This consideration will, however, be easily met by a little discretion in timing the various exposures. The subject is full of interest, opening, as it does, entirely new ground for the scientific amateur.

Critical Notices.

A MANUAL OF THE CARBON PROCESS OF PHOTOGRAPHY. By Dr. Paul Liesegang. Translated from the Sixth (revised) German Edition by R. B. Marston. With Illustrations. (London: Sampson Low, Marston, Searle, and Rivington.)

Dr. Liesegang has so long been known by photographers as a practical and trustworthy writer on photography that his name at once carries weight, and a manual of the carbon process from his pen is sure of a welcome. His carbon manual has reached, in Germany, six editions in a comparatively short time, and the revised edition has been carefully translated to form the volume before us. A caustic critic, speaking of this work, observed: "A good translation of the Autotype Manual into German, translated again, skilfully enough, into English, may make a new book, but not one which contains anything new." We repeat the remark simply to protest against its accuracy. Assuming for a moment that the Autotype Manual may have been the basis of the present work, it will be very manifest to an intelligent reader that it derives its quality essentially from the fact that the writer is describing processes with which he is personally familiar, as having worked them, and that the work is no mere compilation. It is clearly a book written by a worker for workers, and as such will be appreciated. Every process of pigment printing is fully described, especial attention being given to carbon enlargements.

The translation appears to be well done. Some of the renderings of technical phrases will perhaps jar on professional ears as unfamiliar—the "dusting-*in*" process for dusting-*on* process, for instance; the powdered graphite or other pigment being really dusted *on* the plate, as it could not be dusted *in*. We think it is to be regretted, also, that in the historical chapter a long extract from a work is given, in which is reproduced the late Mr. Sutton's denial of the claims of Mons. Poitevin to the origin of carbon printing, on the ground that there was no evidence that this gentleman had ever exhibited a carbon print. It is admitted that he published "the idea" of a process, but denied that there was any evidence to show that it was more than an idea. That is, Mr. Sutton had not met with evidence, as thousands of others have not, and could not have done. We published some years ago the fact that M. Poitevin had sent us dated prints of near the date of his specification, which, to us, bore internal evidence of authenticity. But the controversy, long settled in M. Poitevin's favour, is not worth reviving now. We have pleasure in recommending Dr. Liesegang in his English garb.

PARIS CORRESPONDENCE.

BY D. WINSTANLEY, F.R.A.S.

Letter No 1.

Thoroughly wearied and worn out, I left England about three months ago, in search, amongst other things, of that mental rest and recreation which the diversions of foreign travel only can afford; and for the time being I find myself located in the gay and splendid capital of the world. I have not taken any large degree of interest in photography since I ceased to be commercially connected with it, about three years ago, and for the last two years or more I cannot have seen above half a dozen copies of the photographic journals altogether. From the almanacs, however (which I have seen), it does not appear that any startling innovations have of late been made. In fact, progress would seem to have resolved itself into something of a humdrum, steady kind, a condition of affairs at which we cannot feel surprise, for it has almost ceased to be anybody's business to attempt the solution of the higher problems which the art suggests, a circumstance which, to say the least of it, is a matter for regret. My own experiments have ceased entirely to have the advancement of photography for their aim, but they somehow keep pretty much on ground interesting to intelligent photographers, and I am surprised myself at the manner in which I keep circling round the subject of light in one or other of its forms. Invisible phosphorescence, or "radiescence," to use a perhaps better term, has occupied a not inconsiderable proportion of my time, and has led to some interesting results which might very readily be turned by photographers to profitable account. It does not appear to me, however, that I am under any obligation to continue producing, at my own expense, results of pecuniary advantage to the professional community at large, and I have accordingly abandoned photographic experiments altogether in favour of others more appreciated and better paid for.

Photographers have certainly acted with unwisdom in railing bitterly against the remuneration of those who make improvements in the processes and appliances of the art their aim. Commercial instincts may be carried much too far, and when they reach the point of demanding the gratuitous labour of others that our own profits may be increased, they become evidences rather of insanity than wisdom; and in this form the commercial instinct has been largely epidemic among the members of the fraternity. "You spend your time and money in producing results which I may have gratuitously at command, which I may advertise in conjunction with my name, and for which I may charge at an extortionate rate, in order to heap up money for my own enjoyment." Such is the demand which photographers have for some years past pretty continuously made upon investigators, and with the result of driving into other fields men capable of serving them. They have reduced progress to the humdrum, steady condition I have named, and degraded research pretty much to the level of finding new methods of cleaning plates and new variations of old modes of soiling them again. My own services—which, in other fields, are found a gain—are presumably a loss to the profession which had once complete command of them, but which, after the close of this series of letters, will know of them no more. The loss may indeed be small; but a large number of small losses make up a significant and portentous whole.

Touching invisible "radiescence," Becquerel has shown that tartaric acid and uranium nitrate possess the singular and interesting property of emitting, after they have been exposed to light, invisible rays which attack the photographic film, and even "print" on silver chlorised paper. So interesting did this matter seem to me, that in 1875 I repeated the experiments which Becquerel had made, and examined, with a view to the detection of this property, a large number of chemical substances of divers sorts, and with the result that I found the property in question to be shared by several bodies other than those in which Becquerel found it to reside. My note-books, however, are in England, and I cannot from memory hazard the names of the materials to which I here allude, for they are fast fading into the limbo of the forgotten past. I also found one or two substances which by "radiescence" actually reverse the photographic process, and make an image faintly formed gradually to disappear. And I successfully traced the spontaneous discolouration of photographic paper to the "radiescence" of the pulp itself, and found numerous means of remedy, some of which I communicated, if I remember rightly, to Dr. Roscoe of Manchester, and to Captain Abney of the Engineers. At the time I abandoned my experiments in this line I was endeavouring to ascertain how far "radiescence" might be regarded as the cause of that curious phenomenon of continued printing known to workers in the carbon process, but absurdly described as the "continuating action of the light." My experiments seemed to show that the green oxide of chromium emited dark rays capable of reducing the chromic acid in conjunction with the gelatine. These researches are, to say the least of them, of interest, and, so far as theoretical photography is concerned, I think it will be admitted they are of moment, too, and I regret, accordingly, to abandon them.

But I digress: my present purpose is that of a Foreign Correspondent, and I may perhaps here remark that these letters will form my last contributions to the literature of photography. The series may not be so short as the reader would naturally suppose, for it is not unlikely that my wanderings will be considerable before I again set foot on English soil, and for the sake of "auld lang syne" I shall be glad to interest the members of a profession to which I once belonged, by the record of such matters as strike me most during the period of my travels. The reader who finds pleasure in what I write will remember, however, that my journeys and my contributions will terminate together, and that these letters are the precursors of my disappearance from the photographic scene.

I left Blackpool on February the 22nd, by train for Liverpool, and proceeded thence by the steamship *Sunlight* (Capt. Rowles) for Bristol, thence by train for Weymouth, thence by boat again for Jersey, and, after some days' stay, by boat once more for Granville (Graunveal), on the north-west portion of the coast of France, and by a very tedious railway route I proceeded from this place to Paris (Pahree), where I arrived on the 9th of March. I have accordingly got somewhat acclimatised, and know Paris as well as I ever knew London, and like it incomparably more. I have been an eyewitness of much of the later work upon the Exposition (ex-po-zeecy-on, with the letter g half sounded at the end). I have seen the towers of the Trocadéro (adairo) complete their rise, and the finishing of the stupendous building in the Champ de Mars (shaumdy mar). I have watched long lines of trains arrive with treasures from every portion of the civilized globe, and I saw the stupendous multitude assembled on the 1st of May. I heard the heavy booming of the cannon of the Hotel des Invalides (Oh-tell-days-Ahn-val-eed), and the heavier booming of the artillery of the sky which accompanied the tropical downpour of that surprising day. I mingled with the surging throng that rolled at midnight down the Rue-de-Rivoli (Rivvully). I saw the million Chinese lanterns which added a fairy charm to the exuberant gaiety of the night. I saw their reflections glance and glitter on the merry waters of the dancing Seine, and I saw the drifting clouds made livid by the myriad lights beneath them, adding the effect of their own fiery flying to the glory and the grandeur of the night. I heard the hundred thousand voices pour out the wild inspiring music of the "Marseilleise" upon the early morning air, and I saw, in the stately obelisk of Luxor, three thousand six hundred years looking down in majesty upon the heaving billows of the human sea beneath. I saw Paris, the gayest and most splendid city of the earth, in her greatest gaiety and splendour, and I heard the rejoicings which rose to heaven as the great Republic pronounced her Exposition open to the nations of the world.

ENLARGING BY THE POWDER PROCESS.

BY W. T. WATSON.

I HAVE just worked out a method of making what I call carbon enlargements—for such they are in reality—by a modification of the dusting-on process, which will prove valuable in special cases.

The process is shortly as follows:—An enlarged transparency is made of the size of picture required, varnished, and retouched with lead pencil, &c. Patent plate should be used. A clean glass is now dusted with talc, and coated with plain collodion, dried, and, whilst warm, coated with sensitive mixture, as used in the dusting process, of which there are several formulas. When quite dry and still warm, print under transparent positive, and develop with finely-powdered and sifted black-lead and indian red. When dense enough, immediately coat again with plain collodion, which should be very thin in both cases, and, when set, place the plate in a dish of water slightly acid, until all the yellow colour is removed. Wash well, and place to dry. When you have finished printing, proceed to transfer like carbon printing, by soaking transfer paper in warm water and laying it down on the print, and passing the squeegee over it in the uasual way, and leave them to dry, when they will strip off the glass with a brilliant surface.

It is quite easy to make an enlarged transparency from carte size up to fourteen by twelve without loss of sharpness, or granulation, and by the means I have pointed out quite excellent prints can be made, and of any desirable colour, and, being permanent, they serve admirably as a basis for colouring.

STEREOSCOPIC TRANSPARENCY PRINTING.

MR. BREESE'S METHOD.—No. II.

BY JOHN HARMER.

THE copying camera being an indispensable aid to success, and claiming attention the next in order, its description will be the substance of the present paper.

Stated generally, this instrument consists of two boxes (deal), blackened on the inside, viz.: one to exclude all light between its front, which carries the negative, and its back, through the apertures in which the lenses are pushed; the other one performing the same office between the lenses and the sensitive plate. Both of these require to be partitioned down their centres, to confine the light transmitted through each half of a stereoscopic negative to its own compartment. They must also have telescopic or bellows bodies, to enable the variations of length necessary for the slight enlargement or reduction of the picture, sometimes desirable, to be conveniently made. If a pair of double combination lenses of about four or four and a-half inches focus be employed, and the transparency is slightly reduced, as is generally the case in copying negatives of the usual stereoscopic size, the length from back to front of the first box, when half expanded, may be about ten inches;

that of the latter, or camera proper, having the fittings for lenses and dark slides, under like conditions, about nine inches. Provision must be made in the negative-carrier for its motion both horizontally and obliquely, for the latter, the kind to be obtained being similar to that from a parallel rule opened out to hold the negative between its two portions, each one of which is fastened in the same perpendicular on the front of the box by a screw passed through the middle of its length.

A framework constructed and secured in this manner affords a ready means for making the slightest alteration for the purpose of bringing any two corresponding objects in each half of the slide into the same horizontal position. The apertures at the back of the box fitted with this arrangement must be of sufficient size to allow the movements of the lenses, described further on, to be made freely. The front of the other box mounts the lenses, and requires, besides a rising motion of the usual description, a means for separating or approaching them.

One of the best methods of accomplishing this is by having a right and left-handed pitched screw, not in one piece, as usually supplied, but divided and keyed together in the middle, a little play being provided for in the longitudinal direction of the joint, so that the slight fluctuations in its length resulting from variations of temperature may not disturb the position of the fronts to which it is attached. Each thread of the screw passes through its respective nut, fastened one on each portion of the separating front; the length of that end of the shaft terminating in a milled head being sufficient to project from the side of the camera within easy reach of the hand. This kind of screw, as its name implies, gives motion to the two pieces in opposite directions at the same time, and is susceptible of fine adjustment.

The object of having the screw divided and keyed together is this. During a hot summer's—or, in fact, any—day, the temperature rises to a maximum, and then gradually falls. A delicate adjustment made in the morning, such as a moon placed at its proper distance in the apparent space of the stereoscopic picture, with the screw shaft in one piece, will, as the temperature increases, expand the metal and separate the lenses, the moon from this cause having the effect of making a retreat into the star depths; on the other hand, if the fixing in position is performed when the temperature is highest, the moon's motion, as that falls, is reversed, appearing to come forward into the regions of the earth's atmosphere. When a whole day has been spent in printing from one negative required for the combination effect of a subject—fifty copies, perhaps, being made—there will be a serious expenditure of time and labour in cutting the plates asunder, and in fixing them in position when superposed on other portions of the picture, the operation needing to be constantly viewed through the stereoscope during its performance. Through the employment of a screw of this kind Mr. Breese experienced much annoyance, the cause of which he had not detected up to the time I parted company with him. Mr. Oakes will probably recollect that the camera he saw him use was fitted up with this disregard for thermal variations, it being so when it was handed over to Mr. Breese.

When these portions of the copying camera have been completed, they will have to be mounted on a board or table, behind each other, the fore part of the first one described being made a fixture, the latter fitted between guides, through which it can easily slide to or from the former one, a separation of about three inches being always preserved, the lenses requiring that space to make them accessible for operations with diaphragms and the rack-work motion upon them. A wooden cover, constructed of sufficient length to project beyond the negative to shield it from oblique rays, without obstructing the necessary light by shading the reflector, and the opposite end not extending quite to the aperture for the dark slide, can be hinged along one of its sides to the table; it will be found very convenient and useful in protecting the camera from dust, light, and heat.

To the front of the table may be hinged, or otherwise conveniently fastened, at an angle of about 45°, a reflector made of plaster of Paris. A very good plan to follow in making one is to have a slight frame of wood, grooved round its inner edge; this, clamped down to a piece of glass, serves as a mould, into which pour the following mixture. Break up all lumps, and finely sift a sufficient quantity of plaster of Paris which has been previously coloured a faint sky-blue with powdered French ultramarine; mix this up with water coloured with sufficient of Judson's magenta dye to strike a violet tint when the proper quantity has been added, and work the whole into a smooth paste of about the consistency of cream. As different samples of plaster vary in the degrees of yellowness to be neutralized, a definite formula cannot be given. Fill up the mould, smooth off the surplus with a straight-edge, and allow to set for an hour or two, when the slab and its frame may be unclamped from the glass and stood up in a warm room to dry. The whole operation of mixing should be performed as quickly as possible, because the plaster so soon sets and becomes unmanageable. The frame is to be left on, being of value in giving strength to the slab, which firmly holds into the grooves provided for the purpose. When dry the glossy surface must be removed by rubbing with glass paper, the result being a beautiful matt surface of pearly whiteness, its actinic value exceeding by many times that of cardboard and white paper, so frequently recommended for reflecting the light. The surface, as it becomes dirty, can be removed by glass papering, which may be repeated, when necessary, till only a mere shell of plaster remains.

Having had three or four years' experience as a retoucher, I feel some confidence in recommending the use of the above reflector to the notice of my brethren in that craft. As I have found that the printing value of retouching, either with colour or lead, is, provided the colour be matched in tint with that of the negative, the same as it appears to the eye upon the negative, when viewed with light reflected through from a white matt surface, such not being the case when a mirror, ground glass, and the like are used, the retouching having to be made much heavier with these to give the negative a finished appearance to the eye when so viewed, the consequence being that nearly every touch stops back too much light, and renders touching on the print a necessity. The easy and economical means for always insuring a clean surface combined with its other advantages has induced me to digress from the particular subject I have in hand to make these observations, which I hope will be justified by being of some benefit to the fraternity.

To return. When a negative is very dense, or a very powerful light is required to produce any special effect, recourse must be had to a heliostat, or such a primitive one for a substitute that may be supplied in directing by hand the reflected sunlight from one or more mirrors, as needed, through a piece of ground glass fitted into the side-light of the studio, care being taken that the camera be some distance away, so that no element of coarseness may be introduced into the transparency by bringing the grain of the glass into focus when a small stop is made use of. The same applies for any reflector possessing grain or marks of any description whereby the light is irregularly reflected.

A NOVEL MAGIC LANTERN.

BY W. J. CHADWICK.

ON Thursday evening, the 9th inst., I had the pleasure of exhibiting the above to the members of the Manchester Photographic Society, and, by desire of many, and for the benefit of others, I now request space for a description of the same.

My object in designing this style was to combine simplicity, cheapness, and efficiency. It will be seen from the accompanying drawing (fig. 1) which is a perspective, and showing the front and one side of the apparatus, that the lanterns can be separated and used singly if required, and that, if necessary, a third lantern on the same principle may be placed on the top. It will be observed that I have dispensed with chimneys, having found them quite unnecessary. The bodies are made of thin baywood, not much larger than cigar boxes, the interiors lined with tin, and perforated in such a manner as to prevent the emission of light, while securing the most perfect ventilation.

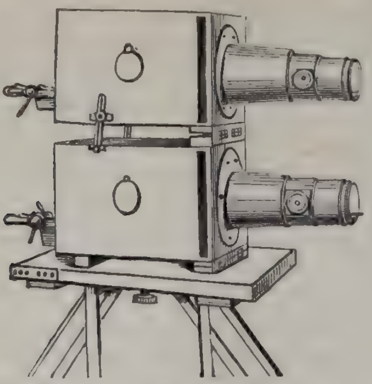


Fig. 1.

The discs are brought concentric on the screen by a hinged piece securely attached to the bottom of each lantern, which forms a means of coupling the two, and also of securing them to a table, stand, or tripod-top, as shown in fig. 2 (which is a perspective view, showing the back end). When adjusted they are kept in position by mean of a screw in a slotted bar at each side, as shown in the drawings. The tin conical fronts holding the objectives are fixed by screws to the bodies, the flanges of the same having the holes slotted, so that the fronts can be detached instantly, and, if required, can be packed in the bodies of the lanterns. The apertures for the pictures are made the usual width, in which I place my well-known registering carriers. The shutters at the sides cover small blue glass windows through which the light may be viewed. The burners I have adopted are on the "blow-through" principle, the nozzles of which can be removed for cleaning when required. I use the disc form of lime, the holders of same being perfectly adjustable, easily removed, and are manipulated by wood discs placed at their outer ends.

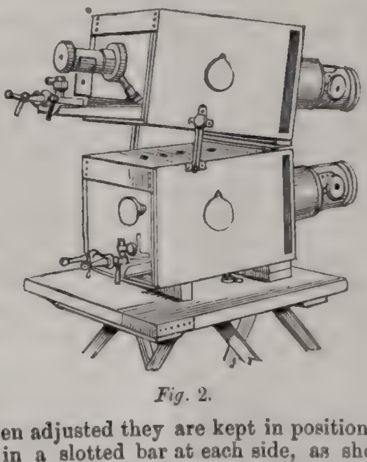


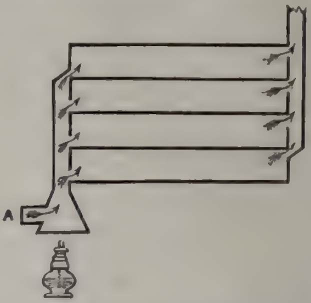
Fig. 2.

I have found these lanterns to realise my best expectations, and as a good, serviceable, and portable apparatus I have great pleasure in bringing the same under your notice.

AN IMPROVED DRYING-BOX.

BY W. J. CHADWICK.

Now that gelatine dry plates have come into more general use, drying-boxes are often a necessary article in their preparation. I have made one for my own use which differs considerably from all others that have come under my notice, and which I think possesses some improvements on what we have previously seen published; and for the benefit of your readers I give a sketch of same.



The box is of wood (well varnished), with shelves placed at convenient distances. It is provided with dust-and-light-tight doors, and at one end is placed a flat tin tube which admits air to each division in the box; a similar tube is fixed at the other end to carry away the moist air. The bottom of the inlet tube is made up by a flat plate, under which a spirit lamp or other means may be adopted to heat the air if required. At A is the entrance for the air, the aperture of which may be covered with a few layers of fine muslin to keep out the dust. The outlet tube may be lengthened to any extent to cause draught, or a small gas jet burning in same will much increase the circulation of the air.

The chief benefit derived in this box is in the fact that the air, instead of passing over each shelf alternately from bottom to top (as is the case with all drying-boxes I have seen), passes directly and independently over each shelf; indeed, each forms in itself a complete drying-box.

◆

ANOTHER SAFETY OXYGEN RETORT.

BY W. J. CHADWICK.

Had it not been for the interest displayed by the members of the Manchester Photographic Society in magic lantern appliances I should have been reluctant to bring before them another oxygen retort, they having previously seen so many. The accompanying drawings, from photographs, illustrate an oxygen retort adapted for the use of plugs, to which is applied my now well-known safety-valve arrangement, in this instance using a weight instead of springs (both methods of which I have already published).

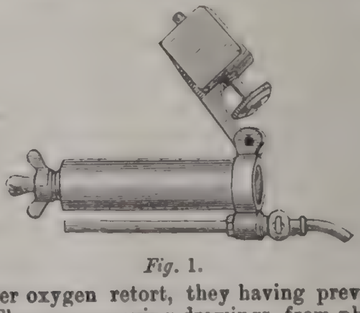


Fig. 1.

The principle is clearly shown in the drawings—Fig. 1 showing the retort open, and Fig. 2 showing it closed. If the pressure should from any cause rise in excess of that to which it is weighted, the gas would be liberated at th front end by virtue of the weight which is hinged to th retort, and has attached to it the cap-lid in such a manne that it is not quite rigid, but is free to move a little so as to find its proper position. On the cap-lid is a small projection, shown in Fig. 2, for the purpose of removing any substance which might interfere with the joint, and also permits of the lid being ground into its proper place. The method of opening and closing the retort is simple:—Turn up the weight and the retort is open, or turn down the weight and it is closed.

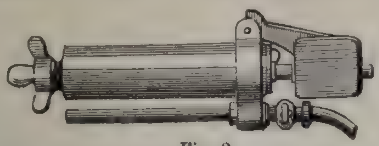


Fig. 2.

Plugs of chlorate of potash and manganese may be made and used in thin sheet iron cases if preferred, or a method I have adopted is to make the plugs on a wire, with a sheet iron disc at the bottom end and a small loop at the other (just resembling a sugar crusher). As soon as the plugs dry—which they do much sooner than when bottled up in a tin case—I dip them in plain manganese nd water; this, when dry, prevents any sticking to the retort. Should the plug break, or any part become detached, the disc at the end of the plug, and attached to the wire, on being extracted, brings all with it.

Correspondence.

CARBON PRINTING.

Sir,—Being a constant reader of the Photographic News, I have taken great interest in the carbon process, but as yet have not put it to practical account

Mr. Johnson a short time ago patented the use of glass coated with gelatine for the double transfer process. A thought struck me: why not use a tinted or coloured gelatine to use the same way? If it is a patent, or infringing a patent, will you kindly burn this? But I do not think it infringes any patent, because Mr. Johnson patented in 1869 the use of collodion for double transfer, and some time afterwards Mons. Lambert patented coloured or tinted collodion for the same use. So if my suggestion is not a patent, I freely give it to the public.—Yours respectfully,

Devonian.

Proceedings of Societies.

Photographic Society of France.

The monthly meeting of the Society was held on the 5th April, M. **Peligot**, Member of the Institute, in the chair.

M. **Guimaers**, of Lisbon, gave a description of an apparatus that he had constructed for taking reversed negatives. It consists of a mirror placed in the camera opposite the objective at an angle of 45° with its axis, the ground glass plate being inserted in the top side. The edges of the mirror are fitted to the side walls of the camera, and its surface bisects the angle between the bottom and back, so as to divide the camera into two triangular prisms. In the discussion on this communication M. Davanne expressed an opinion that to the best of his recollection a similar arrangment had been previously suggested.

Among the extracts from foreign journals read to the meeting was one from an article in the *Photographische Mittheilungen* by Herr F. Wilde, wherein he proposes to substitute leaves of gelatine as a support for the collodion film for glass plates, which are at all times heavy, breakable, and non-portable. He takes an ordinary leaf of uncoloured gelatine, dips it into a solution of 4 grams of caoutchouc in 100 grams of benzine, and then lets it dry. Before coating it with emulsion he transfers it to a glass plate, and then proceeds to expose and develop it in the usual way. Negatives taken in this way can be kept for a long time either on the gelatine leaf alone, or by spreading the latter on a sheet of paper rendered transparent by a varnish of mastic and oil of poppy seed.

In a letter to the *Bulletin Belge*, M. Duchauchois recommends what he considers to be an easy and certain means of preventing reticulations in the carbon process. The tissue is sensitized by immersion for from a minute to a minute and a half in the bath, at a temperature not above 10° C., and is then pressed on to a sheet of waxed and collodionized sheet of glass, as if for double transfer. It is next sponged between sheets of blotting paper, and allowed to dry. When quite dry, the tissue and collodion together are detached from the glass, and are then submitted to the usual process.

In the same journal, M. Duchauchois also gives the formula of a developer of which he thinks very highly, and which, if allowed to act the proper length of time, will also intensify. When using it the exposure should be as short as possible.

Rain water ...	600 grams
Iron sulphate ...	30 ,,
Uranium sulphate ...	4 ,,
Copper sulphate ...	1 ,,
Ammonium sulphate ...	15 ,,
White sugar ...	8 ,,
Acetic acid (No. 8) ...	45 c.c.

To give the negatives a good printing colour, he flows over the plate, after fixing and washing, a solution of

Water ...	600 grams
Platinum chloride ...	0·2 ,,
Mercury chloride ...	0·06 ,,

Herr **Fritz Haugk** in the *Chemische Centralblatt*, describes a method, which appears not to be generally known, of extracting the gold from an old intensifying bath. Having collected enough of the waste bath, he adds sodium bicarbonate until the solution gives an alkaline reaction; he then adds sufficient aniline red to make the liquid of a dark colour. After an exposure to the light of from six to eight hours, the gold will be precipitated in the form of a violet powder; the supernatant liquid must then be poured off, and after enough of this gold powder has been obtained, it is converted in the usual way into chloride which can be used for the preparation of fresh baths.

M. **Chardon** reminded the meeting that M. Jeanrenaud had invented a method of detaching negatives for the purpose of reversing them, the great drawback being that the gelatine film took a long time in drying. M. Chardon has succeeded in obviating this difficulty. He prepares beforehand the gelatine pellicles by pouring hot gelatine on glass plates previously rubbed over with talc or ox-gall; when dried these pellicles are coated with a layer of castor oil collodion, detached from the support, and kept for use. When a negative is to be detached, one of these pellicles is cut to the exact size of the plate, and both are immersed in water, and they are then lifted out together, the pellicle being in contact by its non-collodionized side with the negative. They are then made to adhere completely by a little gentle pressure, and left to dry; the next day the pellicle can be easily detached from the glass, bringing the negative with it.

Photographic Society of Berlin.

A meeting of this Society was held on the 2nd May, Herr C. **Brasch** in the chair.

The only paper of interest was one read by Herr Ernst Duby, entitled "On this and that," or, as we should say, "On things in general." He touched principally on two subjects: the first of these was the effect of adding colouring substances to the collodion; the second, inverse sensitising process as described by the, Obernetter (see *Photographic News* for 3rd May, page 206). With regard to the first of these subjects the speaker expressed a decided opinion that only a small portion of the colouring materials which have hitherto been recommended for tinting collodion have any practical value. For instance, the use of fuchsine ruins the silver bath, while it incrases only very slightly the sensitiveness of silver bromide to the less refrangible rays. The addition of fuchsine to collodion necessitates a material acidulation of the silver bath in order to avoid veiling; moreover; it is worthy of notice that the presence of free nitric acid, though completely obliterating the absorption band of the fuchsine spectrum, by no means weakens the action of the silver bromide film stained with fuchsine in respect to its sensitiveness to the less refrangible rays. This seems almost to afford evidence contrary to the opinion of those who maintain that the sensitiveness of stained films stands in direct relation to their power of absorption. For the rest, the speaker had observed that the silver bath would work free from fog with fuchsine plates only when the free acid had been neutralised by sodium bicarbonate, and the bath then acidulated afresh. The presence of sodium nitrate appeared to act, at best, in this case, as a preventive of fogging. Herr H. Joop made a similar observation, for he found that a slight addition of sodium nitrate to the developing solution helped to produce plates free from fog

As an illustration of these remarks, the speaker threw on the screen, by means of the Sciopticon, the images of various spectra photographed on different coloured collodions, and showed the action of the separate colouring materials. Eosin plates gave the best result, while films stained with fuchsine, methylgreen, &c., were much less sensitive.

Coming to the second subject of his paper, the speaker maintained that the suggestion of Obernetter for inverting the sensitising process was by no means a new idea; on the contrary, it had been carried out formerly in exactly the same way as that now proposed. Further, he remarked that, notwithstanding the inversion, fogging quickly made its appearance, so that the bromide bath soon had to be renewed; a defect which, as regards this process, was perhaps not of much consequence, but which always gave rise to an immensity of work and bother. Another objection to the proposed method is the fact that the bromide bath, once spoiled, is lost for good, whereas from a spoiled silver bath the greater part of the silver could be recovered. Finally, he gave as his decided opinion that the only certain dry process with stained silver bromide was that by means of emulsions.

Talk in the Studio.

A Pneumatic Instantaneous Shutter.—An ingenious amateur, Mr. Cadett, whose name will be more familiar eventually to photographers, has recently invented, and Messrs. Marion and Co. have brought out, a most ingenious and novel shutter for the lens, by which an exceedingly quick closure can be made with singular ease. Its aim is chiefly for the studio, and for use in portraiture, and it will be found not only a great convenience to the portraitist, but of essential comfort to the nervous sitter, and will greatly facilitate the securing of natural expression. Every portraitist knows how apt the eyes of the sitter are to follow the hand of the operator as he lifts them to remove the cap from the lens. This has been to some extent obviated by the use of a shutter inside the camera, moved by a pinion outside. But still the hand must be lifted to the camera, and the operator must stand by his weapon, which the nervous sitter thinks, as the hand is raised, is about to be "fired off." Mr. Cadett's shutter can be closed by the operator when he is many yards from the camera, a thin india rubber tube connected with the shutter and with a ball in his hand affording full facilities for effecting the exposure. The operator may have just arranged the last fold or ribbon, and whilst standing beside the sitter and chatting, watching for the desired expression. This seen, without other movement than in pressure of the ball in his hand, the exposure is made. If a movement is seen, the shutter may be opened and shut half a dozen times during a sitting, the whole arrangement being entirely under the control of the operator, without the aid of the assistant generally needed, and not always under control in taking sittings of children. It is simply necessary, however, for the portraitist to know that this little appliance enables him to control the exposure from any part of the room he may desire, to assure him of its great value; and it scarcely needs further recommendation from us beyond stating the fact. We may add, however, that its working is perfect, involving no hitch or trouble of any kind.

New Photo-Engraving Process.—The art of photolithography and the modification by which a drawing is photographed on wood instead of being traced by the artist's pencil, are tolerably familiar to the public, but the zincographic processes which at first promised to revolutionise the work of the wood engraver are still unable to compete with him. At the Paris Exhibition a new method of photo-engraving is shown in the shape of specimens of its work, and if rumour speaks truly, an important invention has been made by M. Michaud, a chemist and druggist in a provincial town of France. The process, details of which are not yet published, consists in taking a metallic cast from a bichromated film of gelatine on which the image has been impressed, or, in other words, transforming a photographic negative into a metallic plate in a short time, and at a cost of about one-tenth that now asked by the most successful photo-engravers. A plate suitable for working in the lithographic press can be obtained, if necessary, in six hours, while blocks suitable for printing with ordinary type can be delivered in two or three days. The process is said to be so cheap and rapid that it will be possible shortly to produce a daily paper with illustrations of current events.—*Echo.*

To Correspondents.

Dave.—At the time when the collodion transfer process was a comparative novelty, we published many articles on the process; but none very recently. You will find a comprehensive paper on the subject in our issue for March 21st, 1873.

An Old Flat.—When we noticed the work to which you refer we simply spoke of the quality of the work before us, knowing nothing of the man. We believe he was a skilful fellow, but from recent information we believe that that is all which can be said in his favour. The new firm to which you refer can scarcely be the same, inasmuch as we have reason to believe that, under another name, the person to whom you originally sent is expiating a breach of the law in prison.

P. C. F.—The markings to which you refer have the appearance of irregular development from imperfect flowing of the developer, which is repelled by the film. The tendency is probably caused by the use of a horny repellent collodion.

Painter.—The production of rich, vigorous collodion images for transfer depends upon many conditions. The nitrate bath must be in good condition, and not very old. The collodion must be ripe, and of good body. A good negative must be used. And the light must be very good; this point is of vital importance. The exposure must be carefully timed. A short exposure and prolonged development give a black tone; a full exposure and rapid development give a warm tone. We prefer a pyro developer, two grains to the ounce, and from forty to sixty minims of glacial acetic acid. The image is made more vigorous and brilliant, and the tone deeper, by final toning with neutral chloride of gold, two grains to an ounce of water.

B. Green.—The refusal of your prints to tone, and the brown colour of the solution, suggest that the toning bath is decomposed from having been touched with fingers which have been in contact with hyposulphite of soda. It is of no further use for toning purposes in that case.

D. E. R.—The ebullition and evolution of red fumes you describe will arise from various causes, but mainly from the presence of too much water. If you have taken the strength of the acid properly, and mixed them in proper proportions, this should not occur. If, however, your cotton be at all damp, or you put too much into the acids, this has the practical effect of adding water. Take care that the cotton is dry, and that you have the proper quantity ready pulled into loose tufts. When the ebullition commences, punch down the cotton well with your glass spatula. Also add quickly a little more sulphuric acid. You should always wear strong gauntlets—preferably of india-rubber—as a drop of the acid spurting on the hand causes a painful sore. When the cotton has been long enough in the acids, lift it out by means of the two spatulas, and put it quickly into a bucket of water, give it a rapid stir round, and quickly change the water, as, until that is done, the cotton is practically in dilute acid. Wash thoroughly, and dry carefully. The cotton would have gained about fifty per cent. if you have managed well.

Chiaroscura.—The vignettes which verge into a black margin are generally produced from negatives which have been vignetted in the camera at the time of sitting. There are various ways of doing this. In one way a vignetting glass is placed in the camera, in front of the sensitive plate. In another, a screen covered with black velvet, with an oval aperture, is placed between the camera and the sitter, which permits only the portion of the sitter which is desired to be taken on the plate; the oval aperture being much out of focus gives a vignetted edge.

J. W.—You have made an error in adding chalk to the acetate bath. Nothing but the gold salt and the acetate of soda should be added to the solution. This would tend to make the bath absolutely alkaline, and an alkaline bath will not keep; it becomes inert, and will not tone. Blue litmus paper is only a test for acidity. The blue becomes red when brought into contact with acid, but remains unchanged in neutral and alkaline solutions. To test for alkalinity, turmeric paper should be used, or red litmus, which is blue litmus which has been reddened by the fumes of acetic acid. It is not necessary to give the prints such a thorough washing before toning. In fact, that tends to hinder toning. One rinse in water for a few minutes is quite sufficient. They will even tone more readily without that. The best you can now do is to take a portion (say one-third) of the solution, and add another grain of chloride of gold to it, then try it for toning. It will probably work all right. If not, there is no remedy: it is waste. There should be no difficulty in adding a little silver solution to a pyro intensifier. They mix readily enough. If insufficient acid be present, the solution will turn muddy and dark. The mounted card is not from a good negative. The face is flat from bad lighting. The print is fading. We will return it; but we have no address, and no addressed envelope.

T. W. Wilkinson.—In our next.

Dr. Van Monckhoven.—In our next.

⁂ As the Editor will be absent in Paris next week, some delay may occur in answers to correspondents, for which the indulgence of correspondents is asked.

Several Correspondents in our next.

The Photographic News, June 7, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Visit to the Paris Exhibition.—II.

[By our special correspondent.]

I will try to give some idea of the Exhibition building. The highest point in Paris, not far from the Champs Elysées, is termed the Trocadéro, and from this point the distant hills around Paris in the vicinity of Versailles are visible. These heights were held by the Germans at the time of the last siege of Paris, and it was to the Trocadéro that the besieged citizens flocked, curious to get a peep at their enemies. It was about the only place whence a good view of the German soldiery was to be secured; and the possessors of good telescopes—and bad ones—made a little fortune in affording peeps at the Prussians. Upon the Trocadéro has been erected a fine building in the shape of a crescent, looking inwards towards the Seine. In the centre of this crescent-building are two lofty minnarets, to be seen standing above the city miles away, and at the base of the minnarets is a vast hall (like our Albert Hall at South Kensington), termed the Salle d'Honneur. If you stand in this hall—or, rather, upon its balconies and terraces—and look towards the Seine, you see, sloping down at your feet, the gardens and buildings of the Exhibition proper. Immediately below you is a cascade that falls into a vast basin, around which are grouped massive models of animals in gold. To your right and left are grassy slopes and masses of blooming rhodedendrons—purple, white, and rose-tinted. An aquarium with picturesque rockwork is on one side, and Moorish buildings on the other. Then comes the bridge over the Seine, and when you have crossed this, and passed by more gardens and fantastic dwellings, you enter the Exhibition itself—a vast oblong building. Down the centre of this building are the picture galleries of all nations. On the left of the galleries are represented the industries of France; on the right, beginning with Great Britain, are the foreign exhibits.

The Prince of Wales—who, as president of the English exhibitors, has worked long and assiduously to make the Exhibition a success—is himself a large exhibitor. He shows all the Eastern presents received during his Indian journey, a magnificent array contained in a dozen large cases, and ranging from a tea service in solid gold to an old-fashioned musket with tawdy ornaments. They say the Exhibition is not finished, and such is, no doubt, the case; but the result of three long visits convinced me that I should be finished long before the Exhibition if I did not give up sight-seeing. It is simply useless to try to do the Exhibition without being done up oneself. I have given it up as a bad job. The pictures alone would take a month; in fact, if you were a painter of landscapes, I doubt if you would ever get farther than the little Denmark collection, where the sunlit woods, the leaves of translucent green, the sylvan glades dappled with light and shade, arrest one time after time. Norway and Sweden, too, whose place in the art world is hardly considered just now, are little behind their Scandinavian sister, and attract more visitors, apparently, than even the French school, the prevailing feature of which are nude, and what "Helen's Babies" would term "bluggy," pictures.

But foreign photographs in general, and those from Great Britain in particular, must be my theme. I think Italy and America are as well represented as any in photography. One frame of babies contributed by Smith, of Chicago, seems to wins everybody's heart. "We came all the way from Chicago," is written under them. Sarony, Gutekunst, and Landy, are other American photographers who contribute good work. Of Albertypes there are fine some examples; and Alessandri, of Rome, shows many excellent portraits.

The Great Britain collection, although there are many good names among the contributors, does not show to advantage. In the first place, they are hung in an unfinished manner; the recesses they fill—or, rather, do not fill, for they are sparsely scattered over the walls in some cases—wearing an unfinished look, and, being close to an open corridor, the pictures have a garish light thrown upon them. You might just as well have hung them about the whitewashed wall of an outhouse. The French photographers, on the other hand, have a court all to themselves, where the prints are more subduedly lighted, and although, in their case, half of them are hung against the light, the other half, at any rate, are done justice to.

Robinson, of Tunbridge Wells, sends two of his fine compositions. One of them is "When the Day's Work is Done," which received a medal at the last London Exhibition as being the best picture of the year; and the other is "Preparing Spring Flowers," which has also been exhibited in London. Robinson shows no portraits, however, which is to be regretted. Slingsby, of Lincoln, occupies the centre of a screen with "Alone," the charming engraving like picture shown in London last year; also three larger portraits which, if they were only more suitably lighted, would be very impressive. Boucher, of Brighton, has some excellent portraits, and Adolph Beau and Maltby exhibit good work. There are three pictures also, which I know to be Mr. Fry's, because I have seen them before; but they bear no name or mark of recognition, a greater pity since two of them, at any rate, are exceedingly good. A fine series of landscapes with chocolate-tinted mounts is also contributed anonymously: Englishmen, as a rule, are not so modest. Lombardi's portraits are well known, and look as well as they can under the circumstances. The Stereoscopic Company send frames of portraits of ministers, ex-ministers, celebrated authors, and celebrated actresses. Among the latter I saw such names as Miss Maud Branscombe, who, I beg to inform your readers, therefore, is a celebrated actress, a fact, I am sure, of which they are ignorant.

Messrs. Elliott and Fry show a fine and extensive series of large crayon-like portraits; but how much of the work is done by the camera, it is impossible to judge; while Mr. Vander Weyde, in a series of cabinet protraits, shows what can be done by the electric light for illuminating the sitter. Faulkener has forwarded a collection of infantile portraits which he knows so well how to secure, and several studies in carbon. The Autotype Company is an exhibitor, and also Vernon Heath, who shows enlargements of the kind with which all of us are familiar. Of animal studies there are contributions by Mr. York and Mr. Hedges—the vast collection of the former embracing some very charming work. Mr. Sherlock also sends some studies of animals.

A Jersey photographer, Baudoux, distinguishes himself both by his portraits and landscapes, some transparencies in carbon being very fine. Mr. England also sends a collection of fine transparencies, which I was very glad to see, for since Breese, no one in Great Britain seems to have been occupied with the preparation of stereo. transparencies of noted places. MM. Leon et Levy, of Paris, have monopolized the whole of the trade in these pictures for a long time, and I am glad to see Mr. England to the fore in this beautiful branch of the art. Mr. England also sends a fine series of Swiss landscapes, and Mr. W. Bedford some English scenes executed in his peculiarly soft and artistic manner. Mr. Matthew Whiting is represented by some good dry-plate work, and Mr. Brownrigg has also several landscapes of merit. Carl Norman shows some charming scenes from India and Switzerland which deserve very high praise, and Payne Jennings brings the list of landscape artists to an end. Mr. Jennings' admirable sketches of Irish scenery are too well-known for me to comment upon them.

I fancy I have seen better enamels of Mr. Henderson than those he has sent; or perhaps it is the unfinished character of the surroundings which detract from their appearance. At any rate, good as the work exhibited is, Mr. Henderson has pleased me better before. Mr. Warnerke exhibits a lot of illustrations connected with his tissue, but does not—a pity, I think—shows his roller dark-slide or tissue, as it is used. He is the only exhibitor from Great Britain who exhibits the results of a photo-engraving process.

My readers may think that, represented as British photography is by the illustrious names I have mentioned, the art should show particularly well at the Paris Exhibition. This is not the case, however, and any one who saw last year's show in Pall Mall will be disappointed in looking at the contributions in Paris. This, as I have before tried to explain, is due more than anything else to their being disadvantageously displayed. Indeed, foreign exhibitors—where there are not many of a class—suffer very much from the present arrangement of the Exhibition, since the exhibits become scattered, and consequently make no show.

A word to those who contemplate visiting Paris this year. I do not profess to know much of the ins and outs of the French capital. I have probably visited it a dozen times, and once lived six months within its walls. But the little experience one has, is of no avail at times. I have paid seventeen francs and a-half for a modest dejeuner for two, of which only four was for wine. In a word, therefore—avoid strange restaurants. If possible, secure your beds before you arrive, and ascertain the price of them: in any case, they will stand you in about double the customary Paris figures. Do not go near English-speaking restaurants, if you can help it, or, worse still, British houses themselves, for my limited experience is that they are more extortionate than others. With care, one can get along pretty well with fifteen or eighteen shillings a day; but be careful, my readers, how you listen to those who guarantee to take you to the gay capital and back for twenty-five shillings. It is not what it costs to get out, but how much is necessary to come home.

I am on my way to Switzerland, and will send some further notes, if there is anything to write about.

COMPOSITE PORTRAITS.*

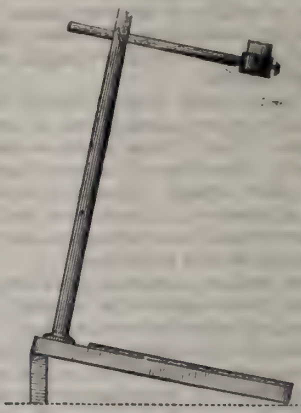
BY FRANCIS GALTON, F.R.S.

DR. CARPENTER informs me that the late Mr. Appold, the mechanician, used to combine two portraits of himself under the stereoscope. The one had been taken with an assumed stern expression, the other with a smile; and this combination produced a curious and effective blending of the two.

Convenient as the stereoscope is, owing to its accessibility, for determining whether any two portraits are suitable in size and attitude to form a good composite, it is nevertheless a makeshift and imperfect way of attaining the required result. It cannot of itself combine two images; it can only place them so that the office of attempting to combine them may be undertaken by the brain. Now the two separate impressions received by the brain through the stereoscope do not seem to me to be relatively constant in their vividness, but sometimes the image seen by the left eye prevails over that seen by the right, and *vice versa*. All the other instruments I am about to describe accomplish that which the stereoscope fails to do; they create true optical combinations. As regards other points in Mr. Austin's letter, I cannot think that the use of a binocular camera for taking the two portraits intended to be combined into one by the stereoscope would be of importance. All that is wanted is that the portraits should be nearly of the same size. In every other respect, I cordially agree with Mr. Austin.

The best instrument I have as yet contrived and used for optical superimposition is a "double image prism" of Iceland spar. The latest that I have had were procured for me by Mr. Tisley, optician, 172, Brompton Road. They have a clear aperture of a square, half an inch in the side, and when held at right angles to the line of sight will separate the ordinary and extraordinary images to the amount of two inches, when the object viewed is held at seventeen inches from the eye. This is quite sufficient for working with cartes-de-visite portraits. One image is quite achromatic, the other shows a little colour. The divergence may be varied and adjusted by inclining the prism to the line of sight. By its means the ordinary image of one component is thrown upon the extraordinary image of the other, and the composite may be viewed with the naked eye, or through a lens of long focus, or through an opera-glass (a telescope is not so good) fitted with a sufficiently long draw-tube to see an object at that short distance with distinctness. Portraits of somewhat different sizes may be combined by placing the larger one further from the eye, and a long face may be fitted to a short one by inclining and for shortening the former. The slight fault of focus thereby occasioned produces little or no sensible ill-effect on the appearance of the composite.

FIG. 1.



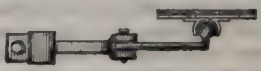


FIG. 2.

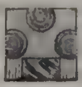


FIG. 3.

FIG. 1 shows the simple apparatus which carries the prism and on which the photograph is mounted. The former is set in a round box which can be rotated in the ring at the end of the arm and can be clamped when adjusted. The arm can be rotated and can also be pulled out or in if desired, and clamped. The floor of the instrument is overlaid with cork covered with black cloth, on which the components can easily be fixed by drawing pins. When using it one portrait is pinned down and the other is moved near to it, overlapping its margin if necessary, until the eye looking through the prism sees the required combination; then the second portrait is pinned down also. It may now receive its register-marks from needles fixed in a hinged arm, and this is a more generally applicable method than the plan with cross threads, already described, as any desired feature—the nose, the ear, or the hand—may thus be selected for composite purposes. Let A, B, C, . . . X, Z, be the components. A is pinned down, and B, C, . . . Y, Z, are successively combined with A, and registered. Then, before removing Z, take away A and substitute any other of the already registered portraits (say B), by combining it with Z; lastly, remove Z, and substitute A by combining it with B, and register it. FIG. 2 shows one of three similarly-jointed arms, which clamp on to the vertical rod. Two of these carry a light frame covered with cork and cloth, and the other carries FIG. 3, which is a frame having lenses of different powers set into it, and on which, or on the third frame, a small mirror inclined at 45° may be laid. When a portrait requires foreshortening it can be pinned on one of these frames and be inclined to the line of sight; when it is smaller than its fellow it can be brought nearer to the eye, and an appropriate lens interposed; when a right-sided profile has to be combined with a left-handed one, it must be pinned on one of the frames and viewed by reflection from the mirror in the other. The apparatus I have drawn is roughly made, and, being chiefly of wood, is rather clumsy; but it acts well.

The front and profile faces of two living persons sitting side by side or one behind the other can be easily superimposed by a double image prism. Two such prisms set one behind the other can be made to give four images of equal brightness, occupying the four corners of a rhombus, whose acute angles are 45°. Three prisms will give eigh images; but this is practically not a good combination, the images fail in distinctness, and are too near together for use. Again, each lens of a stereoscope of long focus can have one or a pair of these prisms attached to it, and four or eight images may be thus combined.

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* Continued from page 256.

Another instrument I have made consists of a piece of glass inclined at a very acute angle to the line of sight, and of a mirror beyond it, also inclined, but in the opposite direction to the line of sight. Two rays of light will therefore reach the eye from each point of the glass; the one has been reflected from its surface, and the other has been first reflected from the mirror, and then transmitted through the glass. The glass used should be extremely thin, to avoid the blur due to double reflections; it may be a selected piece from those made to cover microscopic specimens. The principle of the instrument may be yet further developed by interposing additional pieces of glass successively less inclined to the line of sight, and each reflecting a different pertrait.

I have tried many other plans; indeed, the possible methods of optically superimposing two or more images are very numerous. Thus I have used a sextant (with its telescope attached); also strips of mirrors placed at different angles, and their several reflections simultaneously viewed through a telescope. I have also used a divided lens, like two stereoscopic lenses brought close together, in front of the object-glass of a telescope.

I have not yet had an opportunity of superimposing images by placing glass negative in separate magic-lanthorns, all converging upon the same screen; but this or even a simple dioramic apparatus would be very suitable for exhibiting composite effects to an audience, and if the electric light were used for illumination the effect on the screen could be photographed at once. It would also be possible to construct a camera with a long focus, and many slightly divergent object glpsses, each throwing an image of a separate glass negative upon the same sensitized plate.

The uses of composite portraits are many. They give us typical pictures of different races of men, if derived from a large number of individuals of those races taken at random. An assurance of the truth of any of our pictorial deductions is to be looked for in their substantial agreement when different batches of components have been dealt with, this being a perfect test of truth in all statistical conclusions. Again, we may select prevalent or strongly marked types from among the men of the same race, just as I have done with two of the types of criminals by which this memoir is illustrated.

Another use of this process is to obtain by photography a teally good likeness of a living person. The inferiority of photographs to the best works of artists, so far as resemblance is concerned, lies in their catching no more than a single expression. If many photograuhs of a person were taken at different times, perhaps even years apart, their composite would possess that in which a single photograph is deficient. I have already pointed out the experience of Mr. Appold to this effect. The analytical tendency of the mind is so strong that out of any tangle of superimposed outlines it persists in dwelling preferably on some one of them, singling it out and taking little heed of the rest. On one occasion it will select one outline, on another a different one. Looking at the patterns of the papered walls of our room, we see, whenever our fancy is active, all kinds of forms and features; we often catch some strange combination which we are unable to recall on a subsequent occasion, while later still it may suddenly flash full upon us. A composite portrait would have much of this varied suggestiveness.

A further use of the process would be to produce from many independent portraits of an historical personage the most probable likeness of him. Contemporaneous statues, medals, and gems would be very suitable for the purpose, photographs being taken of the same size, and a composite made from them. It will be borne in mind that it is perfectly easy to apportion different "weights" to the different components. Thus, if one statue be judged to be so much more worthy of reliance than another that it ought to receive double consideration in the composite, all that is necessary is to double either the time of its exposure or its illumination.

The last use of the process that I shall mention is of great interest as regards inquiries into the hereditary transmission of features, as it enables us to compare the average features of the produce with those of the parentage. A composite of all the brothers and sisters in a large family would be an approximation to what the average of the produce would probably be if the family were indefinitely increased in number; but the approximation would be closer if we also took into consideration those of the cousins who inherited the family likeness. As regards the parentage, it is by no means sufficient to take a composite of the two parents; the four grandparents and the uncles and aunts on both sides should be also included. Some statistical inquiries I published on the distribution of ability in families* give provisional data for determining the weight to be assigned in the composite to the several degrees of relationship. I should, however, not follow those figures in the present case, but would rather suggest for the earlier trials, first to give equal "weights" to the male and female sides; thus the father and a brother of the male parent would count equally with the father and a brother of the female parent. Secondly, I should "weight" each parent as 4, and each grandparent and each uncle and aunt as 1; again, I should weight each brother and sister as 4, and each of those cousins as 1 who inherited any part of the likeness of the family in question. The other cousins I should disregard. The weights, as previously mentioned, would be bestowed by giving proportionate periods of exposure.†

Composites on this principle would undoubtedly aid the breeders of animals to judge of the results of any proposed union better than they are able to do at present, and in forcasting the results of marriages between men and women they would be of singular interest and instruction. Much might be learnt merely by the frequent use of the double image prism, as described above, which enables us to combine the features of living individuals when sitting side by side into a single image.

I have as yet had few opportunities of developing the uses of the composite photographic process, it being difficult, without much explanation, to obtain the requisite components. Indeed, the main motive of my publishing these early results is to afford that explanation, and to enable me to procure a considerable variety of materials to work upon. I especially want sets of family photographs all as nearly as possible of the same size, and taken in the same attitudes. The size I would suggest for family composites is that which gives one-half of an inch interval between the pupil of the eye and the line that separates the two lips. The attitudes about which there can be no mistake are: full face, an exact profile (say) always showing the right side of the face, and an exact three-quarters, always showing the left; in this the outer edge of the right eye-lid will be only just in sight. In each case the sitter should look straight before him. Such portraits as these go well into cartes-de-visite, and I trust that not a few amateur photographers may be inclined to make sets of all the members of their family, young and old, and of both sexes, and to try composites of them on the principles I have described. The photographs used for that purpose need not be in the least injured, for the register marks may be made in the case into which they are slipped, and not in the photographs themselves.

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* "Hereditary Genius," p. 317. Column D. Macmillan, 1869.

† Example:—There are 5 brothers or sisters, and 5 cousins whose portraits are available; the total period of desired exposure is 100 seconds. $5\times4+5=25$; $\frac{100}{25}=4$; which gives $4\times4=16$ seconds for each brother or sister, and 4 seconds for each cousin ($5\times16+5\times4=100$).

PRINTING SOLUTIONS, PRINTERS, AND RETOUCHING.

BY J. A. TODD.*

Positive Bath.—Take, say, half pound of nitrate of silver; dissolve in sixty ounces of water; and separately dissolve half ounce of citric acid, half ounce of alum, ten grains of permanganate of potassa. Add to the silver solution in the order as here written, and stand in the sunlight a day or two to clear. Filter well before using. Float the albumen paper two minutes. Draw carefully over two glass rods; one rod a little above the other, so that the paper will touch both rods whilst being drawn from the bath. Dry slowly, and fume thirty minutes. If, upon hanging up to dry, the paper looks as if greasy, or that the silver solution forms in drops on the surface of the paper, add more water to the solution, and draw more carefully over the glass rods. This makes the best positive bath I have ever used. Its advantages are: toning easily, evenness when toned, a beautiful richness in colour, entirely free from metallic spots or stains, and the paper, when silvered, remains whiter for a longer period. Indeed, I prefer it a day old at least. In using glass rods in the foregoing manner, I find it necessary to carefully wipe well with a wet rag, so as to remove any adherent particles that might abrade the albumen surface.

Now, in regard to printing and the printer. So much having been already written in reference to the former, I will, with all due respect to those working in this line, make a few suggestions, and I trust the intelligent printer will see the point at which I am driving; so that both parties, when situated like myself in this particular, may be mutually benefited. To all those who are wishful to understand their position in our profession, I need offer no further apology for my remarks. I will, therefore, say to all who think best to act upon the advice of the much-lamented Horace Greeley, and "Go West," to think twice before they make a move; and to those who have already started, to stop by the way, and learn to forget their stereotyped recommendations of having worked for the leading establishments in different parts of the country—more particularly New York. It is worse than bosh to say that Sarony hardly knew how to get along without them, or that Kurtz had really turned out but few good pictures since they left, &c. I will plainly say to all such: they are not needed in the business at all, much less in a country like California.

Where all have sat frequently for their portraits, and are presumably exacting in having their ideas carried out, to hear their talk in the operating-room, you would believe they were all bred to the profession. And to all those who *will* come west, first try and stay a little longer where they are able to make a living simply by printing alone; and that, during the very large amount of their leisure time, they will sit down with a will, and learn to retouch negatives. This branch of the business, Mr. Editor, I am sure ought to be combined with that of printer—printer and retoucher. I hold determinedly to the opinion that by retouching you more readily learn the good and available properties in a negative—learn more by retouching in a quarter of an hour the real private character of a negative than you can by printing six months. So far, the printers have, as a rule, ignored all chances of combining the two branches of the business, seemingly forgetful that but few galleries can employ both printers and retouchers, their business being too small to need both; I for one have for long been in this very condition, and have had to endure it through necessity.

I am very much surprised to think that the printers have so long been heedless to the advantage of so favourable an opportunity of extending their usefulness in the business. The simple printing is as near all mechanical as anything requiring a little judgment possibly can be. Retouching is very intimately allied to it, even in that very particular; one remove higher, perhaps; certainly a branch of the business requiring more careful, studious application. Combine the two branches in one person, even if it needs a wider scope of intellect to meet the requirements; the profession will be benefited thereby, and a vacancy that hitherto has been but exceptionally filled, even in the leading large establishments, as well as in those where business, like my own, is of very limited capacity, supplied.

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* *Philadelphia Photographer.*

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THE DUSTING-ON PROCESS IN RELATION TO THE PRODUCTION OF NEGATIVES.

BY DR. JULIUS SCHNAUSS.*

The process for producing encaustic photographs on porcelain, glass, and enamel, for which a patent was taken out in the year 1860, by F. Joubert, in London, forms the foundation for the direct reproduction of negatives, which is of so much value, more especially in the carbon and collotype processes. Before that time it was impossible to reproduce a negative unless by the roundabout method of a diapositive, either by a direct copy—by means of a dry plate for development, of silver chloride collodion, or of a pigment print—or else by a second exposure in the camera, and from this, in the same way again, a negative. It is easy to see that there is here great room for intentional, and still more for unintentional, departures from the original, as regards both vigour and intensity. The shorter, therefore, the process of reproduction is, the better; and in this, as well as in many other respects, the dusting-on process deserves the prize. Only in the case where the original negatives have been specially taken for collotype or carbon prints could the reversing of them by means of transfer to gelatine be preferred. The process published by Ad. Braun always gives the best results.

The original method of Joubert is essentially the same as that now employed by Obernetter and Husnik for the reproduction of negatives, except that, as is self-evident, Joubert used a transparent positive, and dusted his copy with vitrefiable pigments, whereas the others employ a negative with graphite according to Obernetter, or finely powdered black chalk according to Dr. Liesegang, for the dusting-on.

Joubert's process was as follows:—He made two solutions: the first, of one part of ammonium dichromate in four parts water, boiled, and filtered; the other of three parts of good honey heated to 38° C., and the same quantity of well beaten and fined white of egg. The two are then thoroughly mixed; and the whole is filtered, and kept protected from the light. This solution is flowed over a well cleaned glass plate, the same as collodion; to assist its spreading evenly, breathe on it, and use a clean glass rod. So soon as the excess is drained off, the plate must be dried at a moderate heat, but with a very faint light, and, while still luke-warm, exposed behind a transparent positive (in our case behind a negative) for one minute to direct sunlight, or from six to ten minutes in the shade. And now the peculiarity of the process manifests itself: a non-exposed plate becomes perfectly black under the dusting powder, just as an under-exposed collodion plate under the developer, while the longer the exposure the greater is the faculty it displays of repelling the powder, until, with too long an exposure, it will not blacken at all. And in this property, which is in complete contrast to that of other sensitive films, lies the explanation why in this process we obtain a copy with the same characteristics as the plate from which it is taken—that is to say, a positive will produce a positive, and a negative a negative. It depends on the fact that the film, in its original condition, is easily moistened, or hygroscopic, so that it attracts and retains the powder; but that, after exposure, under the influence of the chromic salt, it becomes horny and insoluble in, or even repellent of, water; in the places, therefore, that have been acted on by light no powder will adhere.

Eighteen years have elapsed since the first publication of Joubert's process, and during this period several modifications and improvements have been introduced; but the method of fixing the developed image remains the same: it is coated with thin, raw collodion, and, after drying, is laid in water to wash out the chromic salt, an object which the porous nature of the collodion film permits of being attained with ease. Unfortunately, notwithstanding the collodion, the entire picture in drying often rolls up and detaches itself from the plate. On this account I prefer to adopt the plan of coating the collodion film, while still moist, with a dilute solution of gum; it will also answer the purpose to paint the edges of the collodion, before it is washed, with a thin solution of caoutchouc or a little negative varnish—unless an image has been so coated with collodion. I have never yet succeeded in washing in spirits of wine or acid without injuring it. Quite as difficult is the coating of large plates, and evenly drying the layer. In this case it is better to proceed as in the collotype process, and to dry the plates in the dark, and in an accurately horizontal position.

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* *Photographisches Wochenblatt.*

By employing the following method, of my own invention, I have produced very good and even films. After thoroughly cleaning—or, still better, albumenizing—a glass plate, I coat it with raw collodion, and, when the latter is nearly set, I dip it into the sensitive chromate bath, just as an ordinary negative is dipped into the silver bath. To produce equal moistening the plates must be carefully watched, when even on those of the largest size is obtained a smooth and thin film of the hygroscopic-chromate solution. The plate is then allowed to drain, and dried over a lamp with the precaution that the edge from which the liquid flowed off should be kept a little lower. If a thicker layer be desired, it can be obtained with great ease by pouring the chromate solution a second time over the plate. As is always the case in this process, the plate must be laid under the negative while still luke-warm.

For dusting, the Siberian graphite is the best, but most expensive. The German graphite, after being dressed and dried, then moistened with spirit, and washed, gives fairly good results. Cingalese graphite does not answer the purpose; but English succeeds better. Pains must be taken to have the dusting-brush, the paper support, the powdered graphite, and the plate all perfectly dry (in damp weather they should be slightly warmed), or the image will be smeared. For the same reason, breathing on the plate to intensify the blackening must only be done with the greatest care; it is, perhaps, better to leave the plate, after it has been dusted, for a few minutes in the dark, when it will have drawn sufficient moisture from the air. The broad dusting-brush must be passed lightly up and down the plate, and made to push a little of the powder always in front of it. The negative must not be allowed to get too intense.

The chromate solution soon decomposes: it is therefore advisable to keep the solution of the chromic salt separate, and only to measure it off and mix it as it is required. The graphite powder penetrates the entire film as far as the glass, so that a faint image remains on the latter after the former has been removed, and this image will appear positive or negative, according as it is held against a light or dark ground.

Dr. Liesegang's formula for the preparation of the sensitive solution is as follows:—

Rain-water ...	1 litre
Gum-arabic ...	50 grams
Glucose or dextrine	50 "
Honey	50 "
White sugar	20 "
Glycerine	5 "
Cold saturated solution of ammonium dichromate...	100 "

In Obernetter's formula the gum and honey are omitted, and the amount of glycerine varies with the hygrometric condition of the atmosphere.

Professor Husnik has lately prepared for sale two solutions of this kind, slightly differing from one another. To his kindness I am indebted for the receipt of two flasks of his solution, with which, for the most part, I have made my experiments; but I am not able to say whether it differs in composition from those prepared by the above-named formulæ. It is claimed for Husnik's solutions that they will keep good for a long time, which certainly is not true of the ordinary one; the odour they give off when the plate is drying betrays the presence of oxgall.

The collodionized film can be removed from the plate under water, especially when a little acid is added; it can be inverted and transferred to other supports, a condition which in the case of the enamel process is of great importance. Also enlarged as well as diminished direct negatives can be obtained with it by means of the camera. It is quite within the power of the operator to produce a vigorous and hard (by long exposure), or a soft and weak image. By this means the defects of the original negative can be corrected. It stands to reason that plate glass plates must always be used; also that albumenizing the same must be omitted when it is intended to invert and transfer the collodionized film.

RETOUCHING.

BY J. LEON PEASO.*

Much is said of this branch, but not to the point, or so as beginners readily see what is meant. If the following remarks will benefit any one, I shall be fully repaid for my trouble in penning them. In the first place, don't go too near the negative; don't go so close as to see each minute spot, but so far away from it that you see the patches these small spots (taken collectively) make. Next have your pencil not very sharp, and the point rounded off, so as to give a dull mark, not a sharp one like a scratch. Now commence on the high lights, and work it clean as you go. Work all the high lights first, and by so doing you will keep the modelling of the face perfect. If you are too close to the negative you will lose all this in a short time; practice only will help you to determine when you are at the right distance. Next work the shadows clean, and be very careful not to fill them up entirely, a very common occurrence with retouchers. See that the lights do not stop abruptly, but "blind" into the shadow. Now you must touch lightly. Don't try to fill a spot with one touch, but touch so lightly as to be unable to see each separate mark, but still to see the spot gradually fill up. You must think of what you are doing. No retoucher can do as nice work and think of anything but the face before him, as he can by applying himself closely to his work, and knows before he puts his pencil down just what effect the mark will have on the finished print. Just so soon as you try to think of your girl, for instance, and try to retouch at the same time, just so sure will you begin to lose the modelling of the face and leave it only half done. It is this modelling that forms a nice photograph, and the lights and shades that form the expression and likeness. I like to grind my negatives, if I can get a fine surface and not too gritty. Pulverised resin is good for grinding. Do not grind any part but the face, and don't let it overrun on to the background.

Experience will teach you how hard a pencil to use, how far away from the negative to get, how hard to touch, and when to stop. Most persons do not learn this latter part, but touch till the face is spoiled for a person of any artistic taste. Practise and accustom yourself to study faces, and find out the different muscles that form the modelling, and, by so doing, you will aid yourself in keeping the shape of each negative you work on.

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* *St. Louis Practical Photographer.*

The Photographic News.

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PERMANENCY IN CARBON PRINTS.

The question of possible instability in carbon prints has, very naturally, created a deep interest far and wide, and we have received many communications not only from photographers in this country and Continental Europe, but also from India and America upon the subject, the general tenor of which, we are happy to say, is amply corroborative of the legitimate confidence in the permanency of pigment printing.

We feel a strong indisposition to introduce anything which may seem to involve comparison of the productions of different makers of tissue or producers of carbon prints; but the interests involved are too serious to admit of the intervention of any kind of personal consideration. And if we need any justification, we may find it in the fact that in the paper which opened this important question the permanency of certain prints made on Autotype tissue was called in question. We are compelled to refer, therefore, to some prints which have been sent to us, which justify Dr. Van Monckhoven's doubts as to the unchangeability of some carbon prints. An American correspondent, who wrote to us immediately after the publication of Dr. Van Monckhoven's paper, being deeply interested in carbon printing, sent us some exceedingly charming prints, in which we have found no change, and promised us the result of some experiments he then intended to make. He was evidently prepossessed in Dr. Van Monckhoven's favour, and described him as making "splendid tissue." His chemist has failed, however, in producing a satisfactory red by the formula given by Dr. Van Monckhoven, an orange-tinted brown, of which he sends us an example, being the best result, and this he finds extremely difficult to mix with gelatine. But the more important part of his communication relates to a couple of carbon prints which he encloses; one printed on Dr. Van Monckhoven's tissue by our correspondent himself, and the other one of Dr. Van Monckhoven's own prints from a negative similar to one of the prints we received from the Doctor. This is endorsed "light brown, will stand exposure to sunlight." Both prints have been partially masked and exposed to sunlight by our correspondent, who finds them "considerably changed." This they certainly are. What pigments may have been used we cannot tell; their original colour is a rich chocolate brown with a rosy purple glow. The brown remains after exposure to sunlight; but the rosy hue has disappeared. Whatever the cause, the result is certainly sufficient to justify Dr. Van Monckhoven's doubts, and the tissue has presumably been produced before continued experiment had led the Doctor to more permanent results. [We here add that since this article was written we have received a further letter from Dr. Van Monckhoven, which, with one or two additional remarks, will be found in another column.]

From another quarter, far removed from America, we receive another interesting communication. Mr. Wilkinson, whose name is well known to London photographers, writes to us from Ceylon, and gives strong testimony to the permanency of pigment prints after exposure to a tropical sun. We can best do justice to his experience by subjoining his letter.

"*Nuwara Elliya, Ceylon, April 26th.*

"Dear Sir,—Just before leaving Colombo for the hills, I got the Photographic News, March 22nd, in which there was a paper by Dr. Van Monckhoven, and I intended then taking an early opportunity of giving my experience in the matter of the whites of carbon prints fading, or rather discolouring, when exposed to the light.

"When I left England I brought away with me carbon prints, single transfer, ordinary double transfer, and Lambertype prints. Some have been framed and hung up in show-rooms, others have been put in printing-frames, half the picture masked with three thicknesses of black paper, and exposed to the sun here in Ceylon, under a tropical sun for six months; at the end of that time, as none of the pictures showed the slightest sign of fading in the blacks, or discolouration in the whites, I took them in, and will most probably send them to you on my return to Colombo.

"Now these prints were all upon ordinary commercial Autotype tissue, some printed in the ordinary course at the Autotype Works, others printed by myself in England and here, so there is some truth in the Autotype Co.'s letter, March 29th; it is only upon allegation that Dr. Monckhoven condemns the Autotype tissue.

"If Dr. Monckhoven and the Autotype Company will send prints to me, through you, at 41, Chatham Street, Colombo, per French mail, I will have great pleasure in submitting both to equal test. I say through you, because the prints could be so mixed that no suspicion of partiality could be entertained—you, of course, marking each privately.

"A word upon other matters. I am here in the centre of Ceylon, 6,200 feet above the sea, and am enjoying weather just like an English summer—except that, perhaps, the mornings are a little colder than in England in summer. After the heat of Colombo (93° in the shade), this change is most grateful. The light is very actinic; but photography is only possible between 6.30 a.m. and 2, after which the sky is overcast, and occasionally the valley is enveloped in mist. The journey up here is splendid (for the first time), eighty odd miles being by railway, twelve miles of which is over the Kaduganawa Pass, about an incline of one in forty-five; now passing beneath beetling rocks overhanging the rails, next passing within twelve inches of a tall cutting on one side, and on the other a precipice two thousand feet deep. The scenery is very grand, especially when clouds are driving about the valleys and on the tops of the hills. When the railway journey is finished, we have four thousand feet to climb and thirty-seven miles of road; to travel in a coach for twenty-two; on foot for fourteen. The telegraph line only makes twenty and a-half miles between the same points, and a novice always squirms at the sharp corkscrew-like turns in the road—at one time winding away up and down amongst the coffee trees, at other parts, patna and cheena, and at every particularly sharp turn come sharp upon a string of bullock-carts, and, as a rule, just escape rolling about five hundred feet through the coffee by the skin of our teeth. In fact, it is so exciting that, at the end of twenty-two miles' riding, we are all tired out, and turn into the Government rest-house worn out. Next morning we have fourteen miles by road, ten across short cuts to traverse, up and up, and round and round, pretty much in the same way as this letter is read line by line, On one part of the road I stood and threw a stone, hitting the road below, three and a-half miles away. At last the top of the pass is reached, and away in front is Nuwara Elliya; in the extreme distance the lake, and in the middle distance and foreground the town, just like an English village, and the common, half way through the valley, is covered with whins and furze in full bloom. Here we get apples, pears, plums, peaches, and most lovely English flowers. These, with a roaring fire, hot grog, and churchwarden pipes, remind one of home.—I remain, yours truly, W. T. Wilkinson."

Finally, from home correspondents we select evidence from Mr. Ferranti, who sends the most charming vouchers in vindication of his position. Mr. Ferranti sends us some cabinet chromotypes, produced more than two years ago, about a fortnight after Lambert left Liverpool, finished by a simple wash of cold water after the alum. They have been exposed to light and dust ever since they were produced. "Has the bloom gone?" asks Mr. Ferranti. "Do you see the green monster there? In fact, can you detect anything wrong?" Mr. Ferranti thinks not, and ventures to believe that they will be found unchanged at the end of a quarter of a century. We see no reason to doubt this. The tone of the prints is perfect—a very rich chocolate with a rosy purple glow; whilst the whites, so far from being green or yellow, are of an exquisite pearly purity. It is upon practical evidence like this that photographers will base their belief, unshaken by doubtful theoretical speculation.

PHOTOGRAPHY IN NATURAL COLOURS.

There are few points in connection with photography in which attempts to deceive or mislead the public have been more frequently made than in regard to photography in natural colours. From the time of the Rev. Mr. Hill, who for years made a persistent attempt to gull the profession in America with announcements that he had discovered a method of producing Daguerreotypes in natural colours, down to recent periods, announcements of photographs in natural colours have been put forth. We do not refer, of course, to the skilful scientific experiments of Becquerel, Niepce St. Victor, and some others, but solely to the various misleading announcements which have been made chiefly for trade purposes. Years ago the plan of making a print transparent, and colouring it at the back, was announced as a mode of producing photographs in natural colours. The recent skilful results of M. Albert in producing mechanical photographs in colour have been announced by some one as photography in natural colours, an announcement which is foolish and misleading, and probably not in any way fairly chargeable to M. Albert. We find an interesting summary of his method, to which we have often recently adverted, by M. Kramer, in our Philadelphia contemporary, from which we make some extracts. M. Kramer says:—

"Mr. Albert has solved the problem of reproducing natural colours in photography by combining his printing process, the Alberttype, with the chromotype. I presume that all your readers are already acquainted with the Alberttype, and I need not say anything further about that process.

"To make Albert's new process clear to you, I have to recapitulate some well-known facts in the chromotype. We all know that the different colours appearing, for instance, in an oil painting, can be reduced to the three principal colours—red, blue, and yellow. By printing those three colours one above the other on the same sheet of paper, we shall get a kind of black; yellow and blue will give green; red and blue, violet. Every picture is, therefore, a mixture of the principal colours, which appear, of course, on different places in different shades of tones. To reproduce a picture by way of chromotype, as many lithographic stones are used as colours appear in the original.

"Albert follows in his invention exactly the way of chromotype; but instead of using lithographic stones, he has his printing plates commonly used for the Alberttype. Instead of being obliged to use as many plates as colours in the original, he needs only three plates, each plate reproducing respectively the three principal colours. New and interesting for us is the manner he adopts for securing plates which can produce such wonderful effects.

"Already, a couple of years ago, a Frenchman, Mons. Ducos du Hauron, tried the experiment of making coloured pictures by aid of photography. He influenced his negatives during the exposure by a red, green, or violet glass, expecting that the red light would produce the strongest effect on the negative influenced by the red glass; but the result showed the contary, since we know that the red light has the least effect on a negative. Albert remembered in time a discovery of Dr. Vogel, that every collodion can be made sensitive for red or yellow light by mixing it with certain aniline colours. Using this discovery, and trying over and over again the effects of coloured glasses on negatives prepared with mixed collodion, Albert adopted the following way as the best for obtaining the three necessary original negatives:

"He takes from a coloured object (for instance, an oil painting) three negatives of the same size and focus, the first one with a collodion sensitive for all colours except red; this negative must be taken under a green glass, and will give the printing plate for red, because all colours had their effect on this negative except red and those colours which are composed of a mixture of red with another colour; orange, for instance, as a colour, being composed of red and yellow, will have a little more on the negative than red. The second one with a collodion sensitive for all colours except yellow and its mixture colours. This negative must be taken under a violet glass, and will give the plate for yellow. The third one with a collodion sensitive for all colours except blue; this negative has to be taken under a red glass, and will give the plate for blue.

"These three colourless original negatives indicate by different shades and half-tones the different varieties of light, dark, or mixed colours in the original. Albert makes from these negatives three plates fit to be used for the process of Alberttype. The first plate will be rolled in with red printing colour, the second with yellow, the third with blue. Plates thus prepared are printed one over the other on the same sheet of paper, exactly in the same way as in the chromotype, the printer taking express care that the outlines of the prints fit exactly one in another. The result will be that the colours of the print correspond in mathematical exactness with the colours of the original."

MR. WARNERKE'S EMULSION.

In his correspondence in our Philadelphia contemporary, Dr. Vogel has some interesting comments on Warnerke's emulsion. He says:—

"In regard to emulsion, Mr. Warnerke has made a very interesting publication by describing his method with all particulars. He differs from all other proceedings, inasmuch as he adds first the nitrate of silver in his collodion, and the iodizer afterwards. I recommended this way seven years ago, while experimenting with Wortley's method, where I often experienced that bromide of silver precipitated in form of fine grains by the addition of the nitrate of silver. Warnerke has also mentioned this fault, and prevents it by his reverse method, in which, according to my experiments, this fault will occur more seldom." We may here remark that we discovered this fact, and mentioned it, nearly fourteen years, when pursuing the course of experiments in perfecting our collodiochloride of silver process. We found that unless the chloride were added last, the silver salt was precipitated, and the emulsion never truly formed. Dr. Vogel proceeds: "It is also very interesting to observe that Warnerke, in his new formula for making dry-plate collodion, dispenses with the gelatine, which was considered, during long years, as a necessary agency for the preparation of good dry plates. Not only Warnerke, but also Wortley and other dry plate men, have given it in their formula, and now they prove unanimously that it is not necessary. Chardon, of Paris, whose new method has been prized there, goes still further, and proves that the high temperature of acids is not rigorously necessary. Warnerke's formula is as follows. Cotton is boiled for one hour in a solution of carbonate of sodium, washed, and dried. In this state it easier takes the acids, so that it is possible to make a great quantity of collodion at once. Take

Nitric acid, spec. wt., 1·420 ...	180 c.c. or	6 parts
Sulphuric acid, sp. wt., 1·840 ...	540 c.c. or	18 ,,
Water	60 c.c. or	2 ,,
Cotton	31 grms. or	1 part

To the nitric acid first the water is added, then the sulphuric acid, and finally, when the mixture has reached a temperature of from 60° to 65° C., by-and-by, the cotton, which has to be very powdery.

"Necessity creates invention. By the new rail-road rules, which exclude the transportation of collodion cotton by rail-road or mail, photography in the provinces is impossible, as the non-observance of this rule is menaced with the highest fines. The chemical works of Schering, in Berlin, have found other means to avoid the calamity. They produce a non-combustible cotton, which forms a gelatinous mass and burns slowly without exploding undergoes no change by concussion, and converts into coal without burning when heated in a closed room. It is a very harmless body; no objections can be raised to its transportation. It is easily soluble in alcohol and ether, and forms, with ten parts of alcohol and an equal quantity of ether, an excellent collodion."

* * *

FRENCH CORRESPONDENCE.

New Edition of Liebert's Work on Photography—Michaud's Photo-Engraving Process—Invitation to Visitors of the International Exhibition.

The New Edition of M. Liebert's Work on Photography.—In the course of last week the third edition of Liebert's complete treatise on practical photography was published under the original title of *La Photographie en Amerique.* It now forms a magnificent volume of not less than 680 pages, whereas the preceding edition contained only 536 pages. The additions to the work, therefore, made by the author to bring it up to the latest date, as regards the inventions, improvements, and novelties that have been introduced during the last four years (the former edition was issued in 1874), fills altogether 144 pages, or nearly a fourth of the contents of the original volume; this is enough to show what pains M. Liebert has taken to make his work correspond to the wants of the present day. As regards the numerous plates that accompany the letter-press, not only are they calculated to render the latter more comprehensible by illustrating fully the instruction it contains, but they also increase considerably the interest attached to the work itself, by furnishing the reader with excellent specimens of the principal processes that are described in it. The first plate, forming the frontispiece, is a splendid portrait of the author executed in photo-engraving by the Roussilon process, and printed in the workshops of the firm of Goupil and Co. This is, indeed, a magnificent proof of the height to which this process has been carried. The exquisite modelling of the face and hands, the neatness of the smallest details in the dress and accessories, the harmonious rendering of the whole, all executed in this beautiful plate by light alone, show that the degree of perfection attained by this engraving process is not less than that of photography itself. The important chapter containing directions for arranging the light in a glazed studio is illustrated by a dozen bust-portraits printed in carbon, and pulled to the number of 2,500 impressions in the work-shop of M. Liebert. Each of these pictures is an example of a different kind of lighting. Diagrams are added showing how the curtains, screens, and reflectors of the glazed gallery are to be arranged so as to produce the particular effect of which the portrait is an example. It is scarcely possible to conceive a more complete and, at the same time, more practical demonstration of the object to be obtained. M. Liebert has used a similar means of demonstrating his instructions in retouching. He submits two copies of the same portrait, printed by the Woodbury process. One of these has been printed from a negative that has been retouched in crayon on chloroform varnish; the other is a print from the same negative before retouching. There are two charming pictures to illustrate the important part of the book which is devoted to the carbon process of photography; the first of these is a matt, the second a bright proof. The last plate in the work is an example of what can be done in printing with fatty inks—it is a reduction of a graceful painting by Chaplin, printed in phototype by M. Thiel, senior.

The Photo-Engraving Process of M. Michaud.—Liebert's work is so completely up to date that we find in it an account of the latest invented process of photo-engraving by M. Michaud, the description of which I have not yet been able to obtain for the *Moniteur de la Photographie*, nor to give to the readers of the Photographic News. It was only at the last meeting of the *Societe Francais de la Photographie* that M. Michaud, a pharmaceutical chemist of Grenoble, and an amateur photographer, exhibited the first specimens of his process which he has recently patented, and which seems to be capable of important applications. The method consists in first taking from the negative to be reproduced a print on bichromated gelatine, as in the ordinary processes, and having as a support a metal plate. After developing, it is dried in the open air, and is then placed in a box which has a bottom formed of some hygroscopic substance; the moisture from this substance causes the gelatine to swell slightly, so that the relief is still more accentuated. By means of a brush the layer is removed from the plate, and applied to a form of fusible metal which is just heated enough to render it liquid. Passing the form under a press, the fusible metal, in solidifying, preserves an exact impression of the image on the bichromatized gelatine, and thus is obtained a solid plate which may serve many purposes. The fusible metal which M. Michaud employs is composed of—

Darcet's alloy	...1000 parts
Mercury	... 110 ,,

But the proportion may vary according to the greater or less degree of hardness which the plate is required to possess. This latter can now be used for obtaining transfer prints for lithography or typography; it also can furnish either raised or sunk moulds for electrotyping. When the original negative has been taken from nature, or from a drawing possessing half-tones, it is essential to produce on it a grained surface, as without it the half-tones would not be copied. For this purpose, a special pellicle of bichromatized and coloured gelatine must be prepared; it is exposed under a glass which has been uniformly dusted with some opaque powder. This pellicle is applied under water to the negative after the latter has been coated with a film obtained by pouring over it a solution of ten per cent. of gum-arabic in water to which a quantity of potassium bichromate (to the amount of three grains to the litre) has been added. Development is effected in lukewarm water, when all the gelatine not affected by light is removed, while the parts that have been exposed remain intact. In this way a grain is formed on the negative, and is reproduced in the plate from which an impression has to be taken. The relief from which the electro-plated moulds are produced has been ingeniously modified by M. Michaud, but we have no space here to go into any further detail. To sum up: we obtain by M. Michaud's process metal plates in inverse, from which impressions may be taken on paper or on stuff; or transfers for lithography and typography; or, in short, almost any kind of plates which can be economically employed on the different kinds of ordinary engraving.

Invitation to Visitors of the International Exhibition.—The invitation which in my last letter but one I addressed to such of the readers of the Photographic News as I could have the pleasure of being of some use to, during their visit to the Exhibition, has been, I am glad to say, largely responded to, and I have had, in consequence, the good fortune of receiving many personal visits, and a number of interesting letters which go to prove that your journal has a wide circulation. I am further encouraged to repeat that I am entirely at the disposal of any of my readers, and that I shall only be too happy to be of any service to them.

19, *Avenue de la Grande Armee, Paris.* Ernest Lacan.

POSING.

BY W. HEIGHWAY.

I think the photographer ought to be a very clever fellow indeed to succeed in obtaining artistic results under the many disadvantages with which he has to grapple—that generally he *is* a very talented fellow to overcome those difficulties so well, and obtain such good results.

The portrait painter has interviews with the subject his brush is to picture; the photographer sees his sitter only a few moments before the time of sitting—moments most likely fully occupied by work of preparation, and care.

The portrait painter prepares a sketch of the pose before commencing his real work; the photographer has just to blaze away for good or ill.

The expression of the sitter being only, in a limited sense, under his control—that is, he has only the few minutes allowed for the work of posing in which to use his arts to ameliorate that awful severity and gloom most persons show when in a photographic studio, and (perchance) to overcome prejudices in the mind of the sitter—the photographer is again at a disadvantage, for the portrait painter can select the best of all the best expressions his sitter presents under pleasant circumstances.

The portrait painter may have many sittings, each extending over an hour or so; the photographer has only one sitting of a few seconds,—

unless he fails.

Is it then surprising he does fail occasionally?

However, as it is his business not to fail ever, and as these comparisons just set forth are not likely to be often remembered in extenuation of unsuccess, it becomes all the more necessary for the photographic artist to acquire all the knowledge that will enable him to secure the most artistic and pleasing results in his work.

The photographer has his sitter with him, at longest, only a few minutes, often under circumstances not very favourable for the production of that contented and reposeful feeling in the sitter's mind productive of serenity of expression—and the photographer, too, by no means at his best, perhaps. What, then, is to be done under these painful circumstances?

It must be accepted, you know, that photography can claim no immunity from criticism on account of disadvantages and incidental drawbacks of the art. Photographers generally, I firmly believe, would not think of urging it! But what is to be done to counterbalance these serious disadvantages?

Certainly, in the first place, studios should be rendered attractive to the eye, and pleasant enough to divert the mind of the sitter from the impending ordeal.

If the studio walls are blank, depend upon it the reflection on the sitter's face will be blank also.

Then, of even greater importance, is the personal influence the photographer brings to bear on the sitter. The photographer should possess good conversational powers, and a certain ease of deportment, which will interest and give confidence to the sitter, and lift from his soul the dreary, hopeless, forsaken feeling too often experienced on entering the operating room.

(I only introduce this too generally adopted term to *record a shudder* at it. How can we expect to find jolly expressions irradiating the countenances of those unfortunate beings about to be *operated* upon?)

Pleasant objects on which the eye can rest, preparing the mind of the sitter before the pose; and good, sensible, pleasant conversation to keep his spirits up, are aids in no mean degree to successful portraiture, calling forth the best and most characteristic expression of the sitter.

I know the power of interesting conversation is not given to everyone—(perhaps it would not be at all a bad thing to publish a Photographer's Conversation Book!)—yet all might acquire, even without the aid of such ingenious and useful work, greater ease of manner, more of interest in the sitter, and a more soothing and reposeful influence.

Know something about art (strange advice, this, to artists!), literature, music, the drama, even of that most awful of conversational topics—politics; all will be found most useful, and you will not suffer by the study.

And, yet more important still, study, earnestly and well, character. Closely observe all men (and women) with whom you come into contact; study them with a kindliness and appreciation to find the best and noblest qualities of each, and endeavour to call forth these characteristics.

Seize every opportunity of studying the facial expressions and the natural, unstudied poses—the appearance of your sitter as presented "when no one is looking," before the care of putting on the picture expression has entered the mind. Once the assumption of expression has set in, it is extremely difficult to win a face back to naturalness; once the muscles have been tightened up to the stiffness supposed to be necessary when facing the camera, how almost impossible it is to induce them back to lissomeness.

Endeavour to keep your sitter's mind from dwelling on the subject; keep miles away from it; and in easy conversation you will not only find opportunities of studying expression and character, but induce ease and naturalness in, and a thoroughly good understanding with, your sitter.

It is thus that your presence and conversation will so act upon the sitter as to bring into repose all discordant emotions, and to prepare him happily for the work you have in hand.

If your sitter be troubled, or full of care or dread, no amount of skilful posing will compensate for the woeful expression you will have to picture.

It may appear that this is too long a dwelling on an unpractical theme. It would be a waste of words *were these considerations unpractical*—but they are not.

Well! you shall have some hard and dry rules next chapter!

(To be continued.)

A NEW SUBSTRATUM.

BY HENRY COOPER.

As so much attention is now being devoted to dry processes generally, and to washed emulsions, with and without subsequent preservatives, in particular, I hasten to call the attention of all dry-plate workers to a substratum which I believe to be new, and which is giving most satisfactory results in my hands. I have been working a good deal lately with washed emulsion films treated with strongly alkaline albumen, somewhat after the fashion of the excellent process introduced by Captain Abney, and entitled "An Emulsion Pocress with Beer and Albumen," and I have found a good substratum a great desideratum. For small plates, such as cabinet, no substratum is necessary, an edging of paraffine and india-rubber dissolved in benzole, and applied before development, being quite sufficient; but for larger sizes it becomes imperative, if the highest class of negative is aimed at, owing to the excessive wrinkling of the film. The film is so expanded by the solutions during development that on drying it is apt to form ridges, which become more apparent on varnishing. I tried all the known methods for holding the collodion film tightly to its glass support, including albumen of various strengths, gelatine, india-rubber dissolved in chloroform or benzole, and French chalk; but all without success. The strongly alkaline albumen invariably so loosened the film that blisters made their appearance before the negative was finished. One day, when almost in despair at the apparent impossibility of getting anything to answer, it occurred to me that I had never tried gelatine rendered insoluble by means of chrome alum. I hastened to prepare some plates, to try whether such a plan would be practically useful, and whether there were any drawbacks connected with it.

My first trials were most encouraging, and I am now able to state that it answers most admirably under very trying circumstances. At first I rather feared the chrome alum might make the film less sensitive; but such is not the case. In fact, in some instances, the presence of the substratum seemed to render the emulsion film slightly *more* sensitive. I trust I may not be claiming as a novelty something which is not one; but, so far as I am aware, gelatine rendered insoluble by chrome alum has never before been used as a substratum for the collodion film.

And now to describe, in a very few words, how I have used it. I am not yet certain that the proportions I have employed are the very best; many more experiments being necessary before that point can be determined. All I can say is that they answer very well. I am just now trying the effect of varying the amount of aqueous dilution, and when my trials are complete will report progress.

Soak sixty grains of Nelson's photographic gelatine in water, drain, and pour on enough boiling water to make eight fluid ounces. Now add two drams of a ten-grain solution of chrome alum, and stir vigorously for a minute or two. Filter the solution through paper into a clean measure, keeping it warm, and avoiding air-bubbles.

To save trouble, a large quantity of each of the solutions, the gelatine and the chrome alum, may be prepared, and will keep for a long time if a little pure carbolic acid be added to each. No more must be *mixed* than is required for the batch of plates, as when the compound solution has once become cold, it cannot be again liquefied with heat. The measure and filter used must be well washed with warm water as soon as done with, for the same reason. The cleaned plates are immersed in a dish of warm water. They are taken out one by one, attached to a pneumatic holder, swilled with warm water, and the surface flowed twice with the gelatine solution (which must *not* be returned to the pourer, but may be to the filter), and, if care be used, very little will run over the back of the plate. After coating, the plates are placed in a light deal box, the bottom of which is covered with three or four thicknesses of clean filtering paper, in such a way that only one corner of the glass touches the side of the box. The lower edge rests entirely on the filtering paper. Cover the box to exclude dust whilst the plates are drying. They are ready for use very soon, though they improve much by keeping for a day or two. Hence it is advisable to prepare a good number at one time.

Although all this sounds troublesome, it does not take so long to prepare the plates in the manner just described, as it does to dry and polish them in the ordinary way, and I trust that all who may try the method may be as well satisfied with it as I am.

THE LANDSCAPE PHOTOGRAPHER IN THE HIGH ALPS.

BY DR. T. RICHARD.*

What a difference there is between the pursuits of the stationary portrait photographer, and his wandering brother-artist who devotes himself to landscape photography, only those can really understand who have undergone the dangers and fatigue of mountain-climbing on the rocky peaks and mighty glaciers of the High Alps. How often does the toiler in his mountain tent, who must perforce quench his thirst at the spring as it rushes from its icy source, envy his colleague in the valley far below, who has only from his glasshouse to slip across the road for a glass of cool beer at the modest *Bierkneipe*! And yet how richly is the mountaineer repaid for all his exertions by the beauties of nature with which he is surrounded! Before his wondering eyes stretch in countless succession towering rocks, glassy tarns, silent glaciers, all illuminated by the life-giving rays of the sun. Solitary— almost forsaken—he stands on these mountain summits towering to the sky; he breathes the pure intoxicating Alpine atmosphere, and his heart bursts forth in a pæan of thanksgiving at being for a few hours raised above the cares, the worry, the bustle, and the excitement of the world below.

Let us, however, in our transports, not forget our work. The requisites for landscape photography on the mountains are of course the same as in the valley, all reduced, however, to what is absolutely necessary, and arranged so as to be in the highest degree portable. On arriving at our ground, the first thing we have to do is to select a suitable spot for pitching the tent, for up here we are far removed from all human habitations; neither hut nor barn can be seen. Our next care is for water. If we happen to be near a glacier or waterfall there will be no want of the clear ice-cold fluid; but sometimes we may have to wander for miles without finding a drop; and then how can we carry on our work? The experienced Alpine photographer will have taken good care not to be placed at this disadvantage. Troublesome as it may be, he will carry with him a large lump of ice, carefully protected from the air, and by melting part of it he soon has a supply of water. For this purpose I have constructed a box fitted with sawdust as a non-conductor, but so arranged that the ice is not liable to become dirty. When the chemicals are laid out, and arranged in the tent, we can proceed to take our photograph. At a height of from 6,000 to 8,000 feet it is not unusual to meet with strong wind; it is therefore advisable to fasten the stand of the camera by a cord to some heavy weight on the ground, in order to prevent the whole from being blown or shaken over during the exposure.

The mountain photographer will do well to adopt the rule of strengthening his negative bath and developer directly he has reached an altitude of 5,000 feet above the sea level. Not unfrequently, in taking views of glaciers at midsummer, I have been compelled to use a bath quite as strong as one that I should use at home in the depth of winter. On one occasion in the month of August, when working on the upper Sandalp on the Tödi mountain (7,690 feet) I was obliged to warm the water that I had brought with me for operating purposes over my field working apparatus. In the High Alps also attention should be paid to the indications of the barometer; it has before now happened to me that a storm arose while I was at work, and in less than an hour broke in torrents over me and all my apparatus. To be patient and keep one's temper under such circumstances is rather trying.

In order to provide against the recurrence of a similar accident, I have now made my tent large enough to hold comfortably four men, so that in case of need it serves me also as a laboratory. In one respect, however, its size is not of so much advantage, for in a high wind it is extremely awkward for four men (I must take this number with me to

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act as porters) to keep the tent in its place by their mere bodily weight; particularly when, as often happens, the tent is pitched on a steep hill-side, whence an enforced plunge into the depths below would be anything but pleasant.

However, while we have been talking the storm has blown over, and we can proceed once more with our work. "It is an ill wind that blows nobody any good," and so we find that even a storm in the High Alps is of some advantage to the photographer. Photographs taken after a storm gain considerably in intensity and accuracy—so much so that they are generally 60 per cent. superior in these respects to those taken, as is usually the case, before the storm commences.

At last, then, after all our troubles and dangers, we have been able to accomplish a good negative with temper established; and full of pride at a successful result, let us return to the work and its cares in the valley below, until the recollection of the pleasures we have enjoyed among the Alps attracts us again to an Alpine life, with all its dangers and all its delights.

RESEARCHES ON INSTANTANEOUS PHOTOGRAPHY.

BY ERNEST BOIVIN.*

On the return of the photographic season I have resumed my investigations, which were suspended during the winter. I am now able to obtain with great certainty dry plates of extreme sensitiveness by combining either an ordinary emulsified collodion or a washed emulsion with gelatine bromine. The following is the method that I have adopted:—

On a plate previously coated with a substratum of caoutchouc, so as to avoid bubbles, I flow a collodion emulsion; it is washed with cold water, and then laid in a pan of warm water. After draining it, I again flow over this sensitive film another one of a hot six per cent. solution of gelatine bromide, made with Kennett's pellicle dissolved in a liquid consisting of equal parts of water and beer. Finally, I lay it horizontally to dry in the drying oven. An exposure of a few seconds only is required, and I use an alkaline developer mixed with beer, to which I add some drops of ammonium glucoside. The image develops without any fog, and has a very marked intensity, and I have met with no instance of failure of any of the different operations.

One of the principal elements of success with the gelatino-bromide process I have observed to be the rapid and regular drying of the sensitive film. To effect this I have availed myself of the excellent directions of M. Odagir for the construction of a proper drying-box, and have introduced certain modifications, which, as they are of importance, I am glad to have the opportunity of making known. In my drying-box the air is admitted through a tube of about ten centimetres in length and from four to five centimetres in diameter; this is filled loosely with cotton-wool, so as to prevent dust being drawn in with the current of air when the apparatus is working. This current I produce by means either of a lamp or of water. In the latter case, the box is connected by an india-rubber tube with the upper part of a cistern of water hermetically closed. When the box is filled with plates for drying I open a cock in the lower part of the cistern, and a current of air is immediately set up. By means of this cock the flow of water can be controlled so as to increase or diminish the current of air, and in this way a rapid desiccation is obtained, and one which is regular and free from dust—essential conditions in the gelatino-bromide process.

Correspondence.

FADING IN CARBON PRINTS.

Sir,—In the last number of your journal I find the following lines:—"We have always hitherto found Dr. D. V. M. eminently a considerate and courteous controversialist, and regret any departure from this," &c.

Your observation is not right. I wrote to Captain Abney, asking him to read my small paper before the last meeting of the Photographic Society. This was not done, because too many papers were to be read. And my paper was inserted in the Photographic Journal in form of a letter.

Here is this letter:—

"Allow me to give a short reply to the observations made upon my paper.

"1. Not being very sure of my English, I wrote the word 'fading' instead of the word 'change.' In my opinion, the carbon prints, as long as they contain black carbon, cannot fade. I have been mistaken in the word, and cheerfully retract it.

"2. It has been asked how I render the oxide of iron transparent. In this way: I make a thick jelly, and dissolve in it an equivalent of ammonio-citrate of iron. I make another jelly with an equivalent of ammonia, and mix the two. The ferric oxide thus formed in the syrupy liquid cannot precipitate, and, when poured upon a glass plate, is transparent. Prepared in any other manner it is opaque. I add it in this state to the gelatine which serves to make the tissue.

"3. I have never said, as Mr. Swan makes me say, that I can make the ferric oxide purple. I produce organic combinations of oxide of iron of a brown red colour, but never purple.

"4. One journal says that I have operated with transfer paper prepared with barium sulphate, which be altered by the chromic acid forming barium chromate, and that this is the cause of the alteration which I have observed in the prints. This is inexact. I have not employed such a transfer paper, and it is contrary to the most elementary ideas of chemistry to affirm that barium sulphate combines with chromic acid to form barium chromate. No acid, mineral or organic, attacks barium sulphate. I regret that such an argument should have been used.

"In conclusion: I may say that no one has given any experiments which clash with mine. It has been attempted to prove that the black prints are unalterable—a fact which I never controverted. I have repeated all my experiments, and I energetically affirm that a simple washing of a carbon print, though it be prolonged for hours, will not eliminate the chromate nor fix the image; but that this object is attained by the addition of one quarter per cent of sodium sulphite to the alum."

Concerning the fact, "Sulphate of baryta," I only refer your readers to the Photographic News, page 137 (my communication to you), and to page 162, your observations. I have full confidence in the judgment of your readers.

Finally, concerning your lines: "We have, during the last two months, repeated many experiments familiar to us before; we have exposed simply washed carbon prints for many days and many weeks to the rays of a burning sun, without producing change in any, save that sent to us by Dr. D. Van Monckhoven, *alleged to be produced on Autotype tissue, but repudiated by the Company.*"

Every one, I believe, must conclude from this last assertion that the print I sent to you confidentially (see Photographic News, page 119) marked "Autotype" on its back, was not produced on the tissue of the Company.

I shall only ask you, sir, if that is courtesy? The truth is: *but repudiated by the Company as being made with the new permanent colours.* That is not the same.—I am, sir, yours faithfully, Dr. D. Van Monckhoven.

[We are well contented to refer readers to what has already been published in our pages. But it must be noted that the changed examples sent by Dr. Van Monckhoven were described as produced on the alizarine tissue of the Autotype Company, and that in the letter of the Company published in our issue of March 29th they distinctly repudiate this. We could, therefore, only allude to these specimens as alleged to be produced on their tissue. When two statements by honourable men clash with each other, we can only suppose the existence of a mistake somwhere. We made no reference in our pages to Dr. Van Monckhoven's communication "confidentially" sent to us, until the same statements had been publicly read at a meeting of the Photographic Society.—Ed.]

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* *Moniteur de la Photographie.*

A LIGHT FOR DRY-PLATE WORKERS, ETC.

Dear Sir,—I send to you a little hint for the use of dry-plate workers when in hotels, &c., and where they are not able to get a light fitted for their use. A candle with yellow paper round it gives a bad light, and also the lanterns which one buys at the shops give a very poor light—at least, I think so. Now, what I use is an ordinary candle, and on it a bonnet reflector, which gives the light of three candles; and over the opening I place or tie a sheet of yellow paper, and have a first-rate non-actinic light. The reflector is also useful to read by, as you have a steady light, and always of the same power. The price of them is 5s., to be got at Mr. Hills, of 4, Haymarket, London.—Yours very truly, C. R. P. Vernon.

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Talk in the Studio.

Photographic Society of Great Britain.—The next meeting of this Society will take place on Tuesday, June 11th, at 5, Pall Mall East, when the following papers will be read:—"Alizarine—its nature, properties, and applications to the arts, and particularly to photography," by J. R. Johnson; "The Alleged Fading of Carbon Prints," by T. Bolas, F.C.S.; and "Photographic Notes from a Travel in Russia, with exhibition of works, materials, and apparatus presented and collected in that country," by Leon Warnerke; also, an original method of preparing pigment and transfer papers will be shown by O. Sarony.

Instantaneous Photography.—A very remarkable improvement in instantaneous photography has been recently introduced by Mr. C. Bennett—a discovery which promises to vastly increase the capabilities of the art of the camera. It is, as might be expected, an improved dry-plate process, in which bromide of ammonium and nitrate of silver are the active agents. Probably the severest test of any instantaneous (so-called) method of photography consists in obtaining a picture of falling drops of water; and this Mr. Bennett has succeeded in accomplishing by photographing the drops of water falling from a jug and trickling over a bunch of flowers. His pictures, when examined under a magnifying glass, exhibit the drops of broken fluid clearly and unmistakably, and are a complete triumph of the photographer's art. They show that the ripple of the waves, the discharge of a gun, and even a flash of lightning, are capable of being depicted upon a negative with accuracy, thus opening up a still wider field of usefulness to the camera.—*Echo.*

Failure in Photography.—Dr. Vogel says, in our Philadelphia contemporary:—"The great depression of the present time has found another victim, an establishment with a universal reputation, Adolph Braun and Co., in Dornach. After the death of Mr. Braun the establishment was turned into a stock company, which closed the year with a deficit. As it is known, the company published a new journal on photography in the German and French languages. The proof number appeared in December, and nothing since. It depends upon the action of a general meeting of the stockholders if the publication shall continue or not. This seems to prove that they had not too great a success with their new enterprise."

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To Correspondents.

Bothered.—Boil your pump water, which will precipitate a portion of the salts which make it hard. It will then serve for washing prints.

R. L. B.—You may imitate the colour of red chalk drawings, or of the Bartollozzi prints, by using the carbon process, using a red pigment instead of carbon. The Autotype Company will, we believe, supply a tissue suitable for the purpose.

G. M.—A wooden dipper, well saturated with paraffin, will answer well.

John Barrett.—To obtain a rich, black tone in collodion transfers, tone them with gold. To secure good results it is very important to obtain a fine, brilliant image first of all. Use a ripe collodion and a pyro developer; then tone with a neutral two-grain solution of chloride of gold. To render the process of transferring easy and safe, it is of vital importance to use plate glass, and have it perfectly clean. Before collodionizing, a very fine coating of wax in ether may be applied and rubbed off again until it seems quite gone. Experience in manipulation is necessary, and a few failures must be expected at first.

R. B. (Leeds).—There are various methods of increasing density in negatives; but for drawings in line to be used in producing photo-lithographic transfers it is important not only to secure density, but also the utmost freedom from fog or deposit on the shadows. Use a ripe collodion of good body, and secure a clean, vigorous negative to commence with; then intensify with silver and pyro. Now dissolve two grains of iodide of potassium and one grain of iodine in six ounces of water, and apply the solution to the negative quickly, and follow this by a very strong solution of hypo, say one ounce in two of water. The first solution will convert any deposit on the shadows into iodide of silver, and the hypo will dissolve and remove it, without injuring the image. Next, take ten grains of bichloride of mercury and one grain of chloride of gold, and dissolve in two ounces of water; apply this until the image is of uniform grey tint; wash, and apply a solution of two grains of hypo in an ounce of water. Wash well, and you will have an intense negative suitable for the work in question.

J. M.—Collect your prints into a heap before they are bone dry, and place them under a weight. They may be mounted then before they curl up. Highly-albumenized paper has a tendency to curl when very dry and unmounted.

J. Lund.—As may have been noticed, the error has been rectified by the publisher. It arose from a mishap in printing.

Advertiser.—Delay is occasioned sometimes, as we have previously pointed out, by sending advertisements to the Editor instead of the publisher.

Unanswered Queries.—Replies to P. S., W. H., G. W. P., Background, and several other correspondents are necessarily postponed, owing to the Editor's absence in Paris.

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METEOROLOGICAL REPORT FOR APRIL.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven, 36 feet above sea-level.

Date.	Barometric Pressure.			Temperature in the Shade.			Remarks.
	Morning	Noon.	Night.	Morning	Noon.	Night.	
1	29 00	28 99	29·98	39·5	42°	42°	Hail and rain a.m. and p.m.
2	28 93	29 00	29·18	44	46	44	Rain and sleet a.m. and p.m.
3	29·21	29·30	29·38	45	45	36	Snow and rain p.m.
4	29 52	—	29·62	43	48	38	Fair, generally sunny
5	29·68	29·73	29·82	43	46	38	Fair and sunny
6	29·93	29·97	29·99	43	46	46	Fair and sunny
7	29·99	27·99	29·82	47·5	48	45	Fair and sunny. Quite a gale at night
8	29 75	29·73	29·81	45	—	44	Fair and sunny. Very windy all day
9	29·92	29·90	29·95	46	—	39	Fair and sunny
10	—	29·90	29 92	48	50	45·5	Fair and sunny. Windy
11	29·92	29·92	30·00	52	66	51	Fair and sunny. Windy.
12	30 00	—	29 88	58	62	56	Fair, generally sunny
13	29·76	29·72	29·72	54	55	50	Rain a.m. and p.m., with wind
14	29·76	29·76	29·72	51·5	56	53	Very fine rain or thick fog this morning
15	29·77	—	29·77	50	58	53	Fair, but gloomy. Foggy a.m.
16	—	29·57	29·56	53	53	50	Rain a.m and p.m.
17	29·51	29·54	29·57	51	56	44	Fair, but gloomy and foggy
18	29 56	29·59	29·52	48	55	51	Fair and sunny
19	29·46	29·44	29 41	54	60	52	Rain this morning and evening
20	29·38	29·37	29·35	53	53	48·5	Rain all day
21	29·42	29·47	29·68	—	59	55·5	Fair, generally bright
22	29 75	29·70	29·67	59·5	62	51	Fair, generally sunny
23	—	29 67	29·62	54	66	54	Fair and sunny
24	29 58	29·65	29·76	54	66	48	Fair and sunny
25	29·82	29·90	29·97	50·5	—	45	Fair and sunny
26	30·04	30·05	30·06	50	56	41	Fair, generally gloomy
27	30 08	30·07	30·03	46	56	46	Fair and sunny
28	29·99	29·90	29·88	46	62	56	Fair and sunny
29	29 80	29·73	29 63	59	63	57	Fair, generally gloomy. Strong wind
30	29·50	29·43	29·46	57	59	54	Rain commenced about 6 p.m., and continued

Summary.	Mornings.	Noons.	Nights
Highest temperature observed	59·5	66	57
Lowest ditto	39·5	42	36
Mean ditto	50·0	55·2	44·4
Mean of all observations	49·9		

Number of days on which rain fell	9
Number of fair days	21
Number of fair days bright	17
Number of fair days gloomy	4
Rain	1·84 inch
Evaporation	4·38 inches
Total rain this year up to the beginning of May	8 49 „
Ditto, evaporation ditto	8·12 „

Note.—From the above it will be seen that the temperature of the evenings was generally considerably below that of the mornings, though we have had no frost to impede the growth of tender plants. Vegetation is progressing most favourably, and there is every prospect of a good year for agriculturalists.

The Photographic News, June 14, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Notes (Photographic and Otherwise) from Switzerland.

I am afraid I have little to tell to interest your readers, although I have kept my eyes open especially with a view to noting down matters photographic. After the beautiful photographs exhibited last year at Pall Mall, which came from St. Gilgen, St. Gall, and which, many will remember, ran in a long row (below the line) on the wall opposite the door, it would be idle to deny that the Swiss have taken a respectable place among artistic photographers. Then there are the fine instantaneous groups and pictures shown last year at the Photographic Society by M. Boissonas, which will be recollected. M. Boissonas, who himself attended at the Photographic Society to exhibit the specimens, could not be prevailed upon to disclose the secret of their production. They were of cabinet size, and even larger, it will be remembered, and included portraits of infants, who could not certainly have given a long sitting. M. Boissonas has a studio at Geneva; but, so far as I could see, none of his pictures were exhibited. Another noted Geneva photographer is M. Charnaux, who has won a high reputation as a depicter of the fine glacier-scenes of this grand country; while Lausanne and Zurich, the two next populous towns, are ably represented by M. Welti and Herr Ganz. The portraits of the latter are exceedingly good, and bear comparison with those of the best London houses, Herr Ganz, by his visits to foreign towns, having made himself thoroughly acquainted with the doings of his brethren.

But Swiss photographers, I fancy, do not do so much as they might. Switzerland is now one gigantic play-ground for the whole of Europe, and, as we know very well, it is those on pleasure bent who are the photographer's best customers. A Londoner will grudge a sovereign or ten shillings to have his portrait taken in town, but readily parts with a couple of twenty franc pieces in Paris for that purpose, where they photograph so much better than at home. Or, if he goes not abroad, then it is Tunbridge Wells, or Brighton, or Leamington which secures his custom. We know this so well at home that photographers of the highest rank settle down at our spas and watering places. Why cannot Swiss photographers take the hint, and make a better show than they do?—for, except at the towns we have just mentioned, they barely make their existence known. Everybody who goes to Switzerland is supposed to have spare cash in his pocket, and is expected, moreover, to part with it. *Point d'argent, point de Suisse*, is the only acknowledged proverb, and although Mr. Cook tells his countrymen he can make their visit an easy one, he cannot, with all his wisdom, alter the saying.

It is a little early to visit Switzerland. Indeed, my companion and myself have been as welcome as the first swallow. At a little spot where I am now staying, near the east end of the lake of Geneva, I made the journey in a span new coach with yellow exterior and red plush cushions, a gay flag on each side of the silver-laced postillion. It was the first of June, the first day of running the coach, and we were the first passengers. Our journey was simply a royal progress. Greetings were extended at every village, and our postillion swallowed sufficient of the acrid white wine of the country to give him the stomach ache through the season. Only once did the horses attempt to go down the steep green slope by the side of the road, for the lathargic state of the postillion towards the end of the journey allowed the steeds to do pretty much as they liked. Fortunately we had not gone far before a friendly peasant came to our aid, otherwise we should have bowled down the mountain very much faster than we went up it. Within twenty or thirty miles of this spot are to be found both German and Italian speaking communities, for in this little country, three, nay four languages are spoken by the inhabitants: French, German, Italian, and Romansche. The last, like our Welsh, is a perfect language, and not a *patois*, resembling, to look at it, Latin more than anything else. The Swiss therefore possess great facilities to become linguists, and that is one reason why so many waiters all over the world are of this nationality. Unfortunately, like the goose in the fable, who bragged that he could walk, swim, and fly, the Swiss speak none of their languages nicely. In some of the long valleys the inhabitants at one end do not understand those at the other.

One thing I have noted this year. There are very few foreign photographs for sale in the shops. Some time ago the pictures of William England and Braun, of Dornach, were everywhere; now one sees only inferior photographs of home production. Now it is rare indeed to see the magnificent glacier scenes of the great Alsatian firm, and, although Charnaux has taken some very fine ice views, these are not always satisfactory. Of Geneva, for instance, where the Mont Blanc and other lofty but distant mountains are to be seen, I did not see a single good picture. In all of them Mont Blanc had been sharply retouched to give it prominence. Fancy one of Mr. Bedford's or Mr. Gordon's hazy landscapes, with its delicate horizon retouched in such a manner that at one point a sharp and solid white mountain rises in violent contrast with all the rest. That vivid peak is Mont Blanc, but it has been made with the brush, and not by the camera. As the mountain is represented by the camera, it is probably but lightly marked, and to give it prominence, therefore, the retoucher sets to work. Of course he spoils the whole effect of the picture, and it ceases to have any interest for those who desire a true *souvenir*. However, the pictures sell, no doubt, for you see whole rows of them labelled "Genéve et le Mont Blanc."

A worse imposition is to sell you pictures which are not photographs at all, but spurious imitations. A long strip is thrown out, with a score of medallion pictures, brown and glazed, which look at a distance uncommonly like photographs, and are purchased as such by many an unsuspecting tourist. Sometimes five francs is asked for a series of this kind, which would, of course be dear at five sous. We know a friend who was in Egypt at the opening of the Suez Canal, and brought back with him, as a souvenir of the occasion, a series of such pictures representing various scenes on that occasion. It still occupies a place of honour among his relics, and he is still unacquainted with the real nature of the prints.

There is one matter I omitted to mention in my Paris notes. Walking along one of the alleés in the Exhibition, I came unexpectedly upon a stall of fancy articles, brooches, caskets, and the like, and in the middle of the case were several enamelled pictures mounted in various ways. It was one of these that attracted my attention, and which was no other than poor Rejlander's "Ginx's Baby." The artist had carefully copied the clever picture, and coloured it. I saw many a visitor's face light up as he passed the case and caught sight of the whimsical little model. There was, of course, nothing upon the picture to mark the name of the real artist.

To my great regret, I am without a camera at this moment—the first time for many a year I have travelled without one. My present quarters are exceptionally favourable for securing pictures, for I am in one of the little cross vales that lead out of the great Rhone valley. On my right is a giant snow mountain, termed the *Dent du Midi*, and on the other hand rise the white besprinkled crags of the famed *Diablerets*. Other less lofty points limit the horizon in other places, and below are deep shadowed vales of beech, and hazel, and larch. The soft verdant green of these woods, rendered more transparent at times by the bright sunshine, is just now exceedingly lovely, the fresh petals being but newly opened at this altitude; so that you enjoy the sweetness of luxuriant verdure and foliage, combined with the grandeur of snow mountains. It it were always fine weather up here among the hills, how pleasant it would be! But, unfortunately, the greenness of the leaves is a sign of clouds and rain. Personally, however, I cannot grumble, for we have had only one foggy day, or rather day when we were enveloped in cloud, and on this occasion a brisk ascent for a thousand feet or so brought us out of the envelope, and we had the satisfaction of beholding one of the greatest charms of a mountainous country—the rising of a group of sharp peaks from a sea of cloud. I would have given something for a camera and dry plate at that moment to depict the scene. Below, as if marked by a few horizontal sweeps of a painter's brush, was the massive cloud, and from this shadowy base arose the crags and peaks of snow reaching far up into the heavens. Curiously enough, whenever the base of a mountain is hidden in this way, it appears thrice as lofty—from the fact, I suppose, that the summit is so far above the cloud. Certainly at no other time can you appreciate so highly the grandeur of mountain scenery.

THE ARGUMENTS FOR AND AGAINST GRAINING IN THE COLLOTYPE PROCESS.

BY DR. JULIUS SCHNAUSS.*

A SELF-TAUGHT photographer, I have, as is natural, always been in the habit of making myself acquainted with all the literature bearing on or relating to the art of photography. But as very few operators are inclined to make a present to the public of their methods and formulæ, discovered, probably, only after a great expenditure of time and money, I have found the path of self-instruction to be by no means an easy one; in many cases even, with an untrustworthy guide, it has turned out to be misleading. And if this were true in former times for the collodion and silver printing processes, how much more so of late years in the region of collotypes! Now also the work is still harder in the same degree as this latter process is more difficult than that of negative and positive. Perhaps I might be allowed here to interpose a remark that these to all appearances so different processes possess in some respects strong analogies; for example, Dr. Liesegang pertinently points out the existence in the collotype and the negative processes of the same necessary relation between the time of exposure, the constitution of the film (particularly its thickness, the proportion of chromic salt that it contains, and the temperature at which it dries), and the colour. In working with collotypes, moreover, just as in silver printing, we meet with prints possessing strong contrasts or monotonous features, the result of a short or long exposure, or according as they have been taken from vigorous or weak negatives. And in the collotype process yet another detail, which can, perhaps, be compared with the development of silver prints, has to be taken into consideration—namely, the inking of the collotype plate. By a greater or less moistening of the printing plate with different—some neutral, some alkaline or acid—liquids (such as glycerine, gum-arabic, alcohol, dilute solution of ammonia, weak nitric acid, &c.), also the employment either of a more or less viscous ink, as well as by a longer or shorter, a weak or vigorous, rolling up, the printer has it quite in his power to produce prints with all the half-tones well expressed, or prints with strongly contrasted light and shade. This is more especially the case in studies from nature; and here we arrive at the consideration of the real subject of this article—the important question of graining. For while the majority of collotypists regard the formation of grain as the criterion of the successful execution of their art, there are others who deny altogether the necessity for it, and endeavour to avoid it altogether—even though in the most and best collotypes the grain can be detected with the naked eye. Thus Vidal, in last year's *Moniteur de la Photographie*, says: "A film of chromatized gelatine exhibits details the finer, shadows the intenser, and lights the clearer, the less has been (up to a certain limit) the exposure. After the plate has been thoroughly washed and completely dried, the shadows should be well modelled, and should show so continuously that *no grain* is at all visible. In rolling up with fatty ink a picture should be obtained as pure, delicate, and vigorous as that after printing on paper." And again: "When, however, the image appears to be *grained*, when the film is no longer perfectly even, but sunk in the shadows, then the blacks will be only of an ashen-grey colour; and if an attempt be made to correct this fault by laying on more ink, instead of shadows will be produced black, opaque patches." A third time he says: "It has been shown, therefore, that the less the gelatine film *has been grained*, the purer and richer will be the prints, and pains must be taken to find a gelatine which will give this result." Besides this, Vidal recommends that collotype plates should be dried in a current of air through the drying-box at a temperature of 32° C. Now it is exactly this comparatively low temperature (instead of the high one—56° to 62° C.—formerly employed) that, according to some writers, produces the grain which, by the best authorities on the collotype process (as, for example, by Professor Husnik), is held to be indispensable.

Whom are we, then, to believe?

It is probable that here, as in so many other cases of doubt, the golden mean will be found to be the best; a grain should, therefore, be produced, but as fine a one as possible. Anyone experimenting with the collotype process will be convinced by his first attempts to carry theory into practice that the presence of a grain is necessary for obtaining good prints and the proper removal of ink from the plate, and, still more, by the fact that linear or grained reproductions can be so much easier printed than copies from nature.

The grain which is formed in the gelatine under certain circumstances, or what we may call the natural grain of the gelatine, is much to be preferred to the one which is produced in it by artificial means, because it is so much better adapted to the natural relations of light and shade in the picture. Artificial graining is formed in collotype plates by adding neutral substances very finely pulverised, or, better still, chemical precipitates (for instance, silver iodide) to the chromatized gelatine while in a fluid state. It has even been proposed to dust the exposed gelatine plate with powdered graphite, and then to rub or tattoo it in with a stiff brush. Now, a not too thin film of gelatine, which has been dried at a low temperature, will often of itself show a grain on its upper surface, and we can strengthen this appearance as far as may be desirable by the addition of different chemical substances, though according to my experience this is effected at the cost of the durability of the film. The phenomenon appears to depend on a partial conversion of the gelatine, which is insoluble in cold water, into the soluble form; it can also be obtained directly, by adding to the gelatine a substance which is soluble in water, and which, like albumen or the carbon-hydrates in combination with the chromates, also yield a film sensitive to light. In the French and English photographic journals appeared some time ago a comprehensive treatise by Placet on these conditions of chromatised gelatine, in which, among other things, it was stated that a grain could be produced in a gelatine film on glass or paper by mixing with the gelatine a little soluble gelatine, or, instead of the latter, some albumen or gum, and then, after chromatising and exposing, by dipping it first in a solution of potassium bichromate, and next in one of iron. The following is one of his formulæ :—

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* *Photographisches Archiv.*

Ordinary gelatine	10 parts
Soluble gelatine	1 to 2 „
Water	100 „
Sugar	1 to 2 „
Bichromate	1 to 2 „

After exposure the plate is plunged into water containing a little borax, in which the image is at once developed and grained. To stop this action the plate must be dipped in water to every 100 parts of which 20 to 30 parts of alcohol and 2 to 3 parts of ammonia have been added; it is then wiped with tissue paper, and completely dried in the dark. After this it is immersed in the following solution :—

Iron sulphate	40 parts
Water	100 „
Acetic acid	10 „

then well washed in weakly acidulated water and dried.

According to Placet, a grain may also be obtained on photo-lithographic paper, a detail which aids materially in in the reproduction of half-tones. For this purpose the paper after exposure must be laid with the side that has been exposed downwards on a smooth and flexible surface, and the other side is then treated with concentrated bichromate solution, which dissolves all the unexposed part of the image; when the picture is fully developed, it is plunged into the iron solution, whose formula is given above. It is not stated whether the blackening with fatty ink should take place before or after. The very excellent photo-lithographic paper of Professor Husnik can also be used for the transfer of grained pictures.

PHOTOGRAPHIC REPRODUCTION OF LINEAR DRAWINGS BY MEANS OF ASPHALTE.

BY J. J. RODRIQUES.*

With the use of chromatised gelatine good typographic plates for printing may be obtained in the following way :— The sensitive compound is distributed over the zinc plate in as thin a film as possible. After drying, it is exposed in the copying frame, and, as before described (see Photographic News for 18th April, p. 188), rolled up with ink. This process, however, requires great care and skill to prevent the picture from altering, for the gelatine is liable to be attacked by the acid. It is therefore more advisable to make the first copy on sheets of tinfoil, as already given in the details of the photo-lithographic process in the Photographic News (see number for 18th April, p. 187), to transfer the greasy picture produced to the zinc plate, and then to etch it in deeply. This process is to be recommended when dealing with plates of large dimensions. In other respects, working with asphalte is easier and more certain.

The asphalte must be such as will be tolerably firm even at a high temperature, and it must be nearly completely soluble in benzine or in petroleum, whose boiling point lies between 80° and 110° C. All the water must previously be withdrawn from the solvent menstruum by means of fused calcium chloride. Prepare the following solution :—

Benzine	100 grams
Oil of lavender	3 „
Asphalte	8 „

To determine the degree of sensitiveness of this preparation, and its power ef resisting the oil of turpentine which is used for developing the picture, flow some of the solution of asphalte over a plate, let it dry, and place upon it a figure cut out of a piece of blackened cardboard; then expose it for from fifteen to twenty minutes to the sun's rays. When the plate has grown cold, dip it with a single motion into a pan filled with cold oil of turpentine. If, after the expiration of at most one minute, the figure comes out sharp and clear—that is to say, if the unexposed part of the film has been dissolved—the solution has been properly prepared.

As asphalte is liable to become sticky in summer weather, and as from this cause the negative might be spoilt, it is as well before exposing to rub over both the negative and the asphalted zinc plate with a soft cloth and some powdered talc. The negative must also be coated with a hard varnish; the one given on page 134 of the Photographic News (see number for 22nd March) will answer the purpose admirably. Having exposed the plate, and before removing it from the negative, it must be allowed to get quite cold. This is expedited by wetting it on the reverse side with a damp sponge.

The admixture of the oil of lavender retards the drying of the solution, and causes the film to be equally thick. As soon as the solution is spread evenly over the plate it must be dried at a gentle heat. For this purpose the most effective apparatus is a cast iron stage of about 75 c.m. diameter, so arranged in a box as to be capable of being revolved, rapidly or slowly as may be wished, by means of a winch outside; underneath are some gas burners. On this stage, previously covered with a sheet of smooth paper, the plate is laid, and the stage is made to revolve until the plate has lost all smell of the oil of lavender.

Directly the picture has developed in the oil of turpentine it must be properly rinsed with water, to prevent the development from going too far. If it be then found that some of the asphalte in the unexposed parts is not dissolved, the plate must be dried between sheets of fine blotting-paper dipped for a few seconds in the oil of turpentine, and again thoroughly washed in water. The zinc plate must next be drawn through very dilute sulphuric acid, then coated with a thin layer of gum, and finally rolled up with ink.

The dish in which the development takes place should have a ribbed bottom, that any impurities in the bath may do no damage. It is filled with cold oil of turpentine, and the plate, after it has been exposed and grown cold, is laid in the bath. The plate is often completely developed in a few seconds; it should not be left too long in the bath, for development will go on during the time which elapses between its removal from the oil of turpentine and its being washed, for which allowance must be made.

COLLODION PRESERVATIVES.

BY CAPTAIN HANNOT.*

Since the introduction of the use of collodion in photography many and persevering attempts have been made to find a method of perserving collodionised plates after they have been sensitised To realise this object would be a marked advance in the path of photographic progress. In its natural state the collodion film, when it is withdrawn from the silver bath, will not keep; it must be used immediately, for when it is sensitive it is impregnated with an excess of silver nitrate, and this, being quickly concentrated by evaporation, immediately dissolves the silver iodide of the film, and crystallises, thus depriving the collodionised surface of all sensitiveness.

A collodion used in a dry state—that is to say, simply deprived of its excess of silver nitrate by thorough washing and then drying—will seldom give a successful result. In fact, such a result is obtained only when the collodion is in a particular condition—that is, when it contains a substance capable of combining with the silver nitrate and rendering it insoluble, as is the case with old collodions, or such as have had resin added to them. But in any instance of this kind the silver iodide of the film will have lost its sensitiveness to an enormous extent.

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* *Phograhische Wochenblatt.*

* *Bulletin Belge.*

Two different means of resolving the difficulty presented themselves:—1st. To prevent the complete desiccation of the film by coating it with some highly hygroscopic substance. 2nd. To incorporate with the collodion, or to cover it with, an uncrystallizable substance which, after becoming dry, should cause it to preserve the property it possessed of being affected by light. Those processes which require the employment of deliquescent substances as a means of maintaining in the collodion its sensitiveness for a greater or less length of time—with the object, that is, of preserving the humidity of the sensitive film—though generally classed among the dry processes, have evidently no right to that name; they are properly designated by the title of collodion preservative processes.

As a rule, the preparation of such presevatives depends on the addition of some syrupy material which remains moist for a long space of time. Among those which have been tried, honey seems to give the best results; and with the honey is mixed glycerine, a substance eminently fitted to keep the plates moist for some time, for, in consequence of its combining with water or alcohol in any proportion, it does not soon get dry. These two substances, whose employment in practice fully comes up to expectation, together form the preservative liquid. The following is the formula for it:—

Honey	60 grams
Glycerine	60 ,,
Silver nitrate (3 per cent. solution)	120 ,,
Kaolin...	150 ,,

It is prepared as follows:—The honey, which must be as fresh as possible, must first be liquefied by heat, and then put with the other substances into a flask; the mixture, after being well shaken, is exposed to solar light, by which means it is rapidly blackened. During exposure the flask must be again shaken from to time, and each of its sides turned in succession towards the sun. It is then allowed to settle, and when the deposit is all thrown down, the supernatant colourless liquid is decanted into a clean flask. This liquid is the preservative solution.

Honey is principally composed of sugar (glucose); and, as is well known, sugar reduces the silver salts even in the dark. The addition of silver nitrate and kaolin to the preservative syrup, and the subsequent treatment to which it was submitted, has the effect of depriving it of the power of reducing the silver in the film without the intervention of light. Otherwise the preservative liquid would set up a nascent reduction on the plate which would prevent the image from developing regularly.

After the plate has been collodionised and sensitised as in the ordinary wet process, the preservative liquid is applied. When the plate is taken out of the silver bath, as much of the excess of silver nitrate as possible is allowed to drain off, and the reverse side of the plate is well wiped. Immediately after draining, and without washing the plate, a sufficient quantity of the preservative syrup to cover it is poured on the collodionised film while still wet, in the same way as when coating a plate with collodion, taking care that no bubbles or froth may form. In this way the preservative is flowed several times over the plate, using each time that which has previously drained off. The excess which drains off at the last time is poured back into the flask containing the deposit of kaolin, and, after being shaken up with it, and clarified as, before, by insolation, may be again used.

When the plate has been thoroughly drained it may be at once placed in the dark slide for exposure, or it may be put away in a close box to be used afterwards. It requires a slightly longer exposure than an ordinary wet collodion plate, but it will not be found to have lost sensitiveness for from ten to twelve hours after its preparation. To keep it a longer time the plate may be washed after sensitizing, but its sensitiveness will then be considerably diminished. Before commencing the development of the plates, they must be plunged into a bath of distilled water, and moved about in it until the water has removed all oily or fatty appearances. They are then dipped into a silver bath, and developed either with iron or pyrogallic acid.

When the plate has to be exposed for a long time in the camera, as is the case in taking photographs of objects slightly or badly illuminated, it is liable to get dry To prevent this a second plate (which must be thin and perfectly clean) is placed in front of it. By this simple and efficacious means the collodion film may be kept moist for a length of time sufficient for any required exposure; it has been exposed in this way for an hour or more without any apparent drying taking place.

PHOTOGRAPHY IN A COAL MINE.

A discovery of considerable interest to geologists has recently been made in the Trafalgar Coal Mine, in the Forest of Dean, a pit belonging to Messrs. W. B. and T. B. Brain. One of the "roads" in the mine required repairing, and in cutting away the walls the workmen exposed two very large, what the miners call "stools," but what geologists know as sigillariæ. For the benefit of the reader not versed in geological lore it may be well to explain what a sigillaria is. It is the fossil form of the trunk or stem of a tree which grew during the age in which the coal measures were deposited, and its genus contributed more than any other to the formation of coal. But it differed very considerably from the forest trees, such as we are acquainted with in these days. Dr. Hooker, one of the most eminent of living botanists, suggests that it may have been allied to the tree ferns, a form of vegetation found only in tropical and sub-tropical countries; others consider that it is one of the lycopods, while others again think it has some relation to the gymnogens, a group of plants bearing naked seeds. The stem is marked by parallel longitudinal flutings, and regular scars formed by the base of the leave-stalks, which had fallen off. The stem rose, without branching till near the summit, when it branched several times dichotomously, *i.e.*, it divided regularly in pairs. The trunk appears to have decayed more rapidly in the interior than externally, so that it became hollow when standing; and when thrown prostrate it was squeezed down and flattened, the bark forming two horizontal layers generally converted into bright shining coal. This is the position in which sigillariæ are generally found; but in the Trafalgar Pit the two fossil trunks are *in situ*, and form exceedingly interesting geological objects. Their exact position has not been taken by admeasurement, but they appear to be erect, their obliquity being about the same as the "dip" of the beds in which they are found. One of them is about eight or nine feet in circumference; the other is rather smaller. Both rise from below the floor of the road, and ascend through the roof—about six feet being exposed—so that their height cannot be determined. The height of the trees is not a matter of great consequence, though it would be interesting to know it; a matter of much greater interest would be to ascertain if the roots are present. The root of the tree known as stigmaria is generally found apart from the stem, in the underclay—the sigillaria being found in the shale—and from its differing entirely in structure from the sigillariæ it was long regarded as a separate plant. The connection of the two has now been shown, specimens having been discovered in which the trunk of a sigillaria rose direct from the crown of a stigmaria. But these specimens are comparatively rare, and while a discovery that these sigillariæ are attached to their roots would not add to our knowledge, they would be objects of considerable geological interest.

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* *The Gloucester Journal.*

The occurrence of such fossils in this locality has led to an attempt being made to place their existence on permanent record by means of a photograph; and last Saturday Mr. G. Embrey (master of the Gloucester School of Science), accompanied by Mr. Percy Thomas, and one or two friends, visited the pit for that purpose. Photography by artificial light has hitherto been an expensive operation, owing to the long exposure necessitating a considerable amount of illumination; but the process has now been considerably simplified by a new ferrous-oxalate developer. By the use of this developer dry plates have been rendered even more sensitive than wet plates, and hence a very short exposure is sufficient. This developer was used by the operators on Saturday, and magnesium ribbon was burned to give the necessary light. The result obtained, though not as successful as could be wished, was fairly satisfactory; a good transparency for exhibition in the lantern has been obtained, and it is hoped that the plate can also be made to yield some fair prints. Photography under such circumstances naturally requires some nice calculations to get the required length of exposure. A trial beforehand with a small fossil had given a good result. In that case the camera had been placed near the object, whereas in the pit, in order to get in the whole of the object, the camera had to be placed at a much greater distance from the tree, and hence a considerable diminution in the illuminating power brought to bear upon it.

PREMIUMS FOR NEGATIVES.

We learn from *Anthony's Bulletin* that at the monthly meeting of the Photographic Section of the American Institute held Tuesday evening, May 6, President H. J. Newton offered six premiums for the best photograph, classified as follows:

First and second premium, portrait negatives, adults.

First and second premium, portrait negatives, children.

First and second premium, landscape or out-door work.

The size of negative is not limited.

The first premiums will be thirty dollars, and the second ones twenty dollars each. The negatives in all cases are to be untouched. Two prints and the negative are to be inclosed in a sealed package and directed to the Secretary of the Photographic Section on or before the 5th of September next. No mention of the name of the competitor is to be either in or on the package containing the negatives and prints; but the descriptions of the offerings, with a private mark indicating the names of the competitors, must be enclosed in a separate sealed envelope and directed to the Judges, in care of the Secretary, Room 22, Cooper Institute.

The premium negatives, and prints from them, are to become the property of the Section. No prints, however, will be made from the negatives without the consent of the competitor.

The premium pictures, with the certificate of the Judges, will be exhibited in the Art Gallery of the Fair of the American Institute, during the annual exhibition, in the coming Fall.

To give the greatest possible value, and secure the utmost impartiality, the Judges will render their decision before the envelopes containing the names of the competitors are opened, and no one but the Judges will be present during the examination of the exhibits. All photographers within a radius of twenty-five miles from the City Hall in the City of New York are invited to compete.

INCREASING THE SENSITIVENESS OF SILVERED PAPER.

BY A. M. DE SILVA.*

Some time ago, while making prints from a negative of a most difficult subject, in which, from the excessive contrast of light and shade, the lights had become too dense to my liking under development, I tinted the paper in the sun previous to printing the picture—a not uncommon practice in the case of "hard" negatives.

After the prints were mounted, I noticed that those made on the "dashed" paper had more detail in the lights—a distinctly different appearance to the toned-down flatness of prints receiving an after-exposure to the light; for, while they were mellow, they were by no means flat. Like very many valuable things, from want of application or want of time to study up, it was shelved until very recently, when I had occasion to resort to the same method. The grinding of the varnish of a portrait (a most abominable practice, for it takes the juiciness and texture out of the picture) had "hardened up" part of the face. I again "dashed" the paper previous to printing. This time, not only had I more detail in the high lights, but an impression printed through the yellow oval mask placed on the negative. I again tinted one-half the paper, and again the same result on the side tinted, while the other unexposed part did not print through the mask at all. Using the same mask I printed the portrait in the sun on ordinary paper, until it was completely bronzed up, without a particle of tint showing under the portions covered by the cut-out, thus conclusively proving that silvered paper which has received a preliminary exposure to the light is very much more sensitive to a much smaller quantity of actinic rays.

SPREADING OR THICKENING OF THE HAIR IN ENLARGEMENTS.

All photographers are familiar with the thick ropy effect of the hair in many enlargements, especially if the hair be grey, or strongly illuminated. All bright objects show a similar tendency. It is also remarkable in the case of astronomical views of the sun, in which the apparent size of the sun varies according to the length of the exposure. The *Mittheilungen* says that M. Angot has made some precise experiments on the origin of this fault, from which it is supposed that it is possible to calculate the amount of the error. M. Angot took several photographs of an object consisting of two right angles separated by a dark space. Exact measurement of the various images taken under different circumstances furnished the following results:—The intensity of the light increases the size of the photographic image. When, however, the light is weaker the image is rather within the geometrical size. Duration of exposure has a similar effect as intensity of light, but there is no proportion between the degree of increase. The irradiation increases also with the sensitiveness of the plate. On removing the stops from the lens, and at the same time considerably increasing the light, it was seen that the images decreased in size as the diameter of the lens increased. Also, pre-exposing the plate exercised a ninfluence on the size of the image. Upon a pre-lighted plate the image is smaller than on a fresh plate. M. Angot finds the explanation of all these appearances in the curvature of the rays of light at the edge of the lens; and, according to this hypothesis, a plate of a certain sensitiveness, and taken with a certain exposure, remains unaffected so long as the strength of the light does not exceed a certain degree.

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* *Anthony's Photographic Bulletin.*

The Photographic News.

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RAPID PORTRAITURE.

Our American cousins engaged in photographic portraiture are much exercised at present by what is termed the "lightning process," by which term is designated a process for producing portrait negatives by an exposure swift as the lightning's flash. Their journals are much occupied by discussing the subject, and the correspondence furnishes much evidence *pro* and *con*. To be just, we must say that the evidence is almost exclusively in favour of the process, the rule, apparently, being about ten in favour of the process against one who is doubtful or unsuccessful. Amongst those who bear testimony in favour of the process, after having tried it, we find letters in *Anthony's Bulletin* from Mr. Black, of Boston, Professor Henry Draper, Mr. Rocher, of Chicago, and other well-known scientific and artistic photographers. The method seems, indeed, to have taken position as a practical success.

The process in question is that of which English photographers heard something about twelve months ago, when it excited a passing interest, and nothing more. M. Boissonas, of Geneva, is the author of the process. Last year he exhibited an album of rapidly produced pictures at a meeting of the Photographic Society, where they were much admired. But there was no evidence in the pictures of absolutely more rapid exposure than had already occasionally been secured with a fine light, rapid lens, and chemicals in good order, and there were subsequently whispers of uncertainties by some one who had tried the process. M. Boissonas has since informed us that his process was at that time in an experimental stage, but that he has since obtained certainty in his operations.

The sight of results, moreover, although very interesting is not necessarily convincing. At any rate, it is necessary to see exposures in order to form a satisfactory judgment. This we have seen, and shall describe to our readers, who must be prepared to be somewhat startled, as we were. On a recent visit to Paris we asked our esteemed Paris Correspondent what were the most noteworthy things in connection with photography to see in Paris at the present moment. One visit, we learned, of imperative interest, must be to the Maison Franck in the Rue Vivienne, where M. Klary was working M. Boissonas' rapid process. An afternoon subsequently spent there was most instructive and interesting, and we are greatly indebted to the frankness and courtesy of Mons. Klary and of Mons. Frank in relation to the process in question.

On our arrival a portraitist from the North of England was just about to sit. It was past three o'clock on a somewhat dull afternoon, black clouds and heavy showers prevailing, the light being, however, moderately good for the time of day. Mons. Klary asked us to suggest the time of sitting, the lens being a Dallmeyer's 3A portrait lens. We suggested twenty seconds, and the English portraitist suggested twenty-five. Mons. Klary, giving three exposures on one plate, gave them respectively two, three, and four seconds. We were then invited into the dark room to see the development. The images came out satisfactorily; number one being slightly under-exposed, that with four seconds over-exposed, and that with three just right. Other sitters followed: in one case a lady in black velvet, with like results, two seconds and three seconds giving the best results. At about four o'clock we were induced to sit, receiving exposures of two, three, and four seconds, in which three seconds gave the best result in our estimation. At a meeting of the French Photographic Society, where the negative was subsequently shown, it is only right to add that some thought that the four seconds' exposure gave the best result; but all were impressed with the amazing rapidity of the exposure.

We have here stated the naked facts just as they have come under our attention, and we are aware that they may seem over-stated. M. Boissonas' claim is a reduction of the exposure to one-fifth of its ordinary duration. If our estimate of the necessary time were correct, the reduction we saw was still greater. But, in the absence of actual comparative tests, estimates may easily err in some slight degree. We were so much startled that our first conviction was that a lens of extraordinary rapidity was used; but on examination we found that this was not so, and M. Franck assured us that he generally used a lens of somewhat long focus to secure depth of definition, or, as he explained, sufficient sharpness all over the face, from the top of the nose to the ear. The lens was, as we have said, Dallmeyer's 3A, which has an equivalent focus of sixteen inches, and was used with a three-inches aperture.

In conversation we learnt that the only change in the ordinary wet collodion process consists in the preparation of the collodion and developer, all the manipulations remaining the same. Contrary to our expectation, a vigorous image is produced on the first application of the developer. No phantom image, requiring skilful management in subsequent intensification to coax it into printing density, but a vigorous, intense, brilliant image, such as the photographer delights to see, follows the application of the developer, and which only occurs when all is working well. No signs of fog or staining. Nothing, in fact, indicating that the image is forced or coaxed into existence. In everyday work these are points of great importance.

As regards the commercial aspect of this question, our readers know more than we did when we visited Mons. Klary, his circular issued in the News a fortnight ago having appeared after we had left London. In conversation we learned that Mons. Klary intends to visit England to bring the subject by practical demonstration under the attention of English photographers. In the meantime, we have pleasure in conveying to English photographers who may visit Paris, the joint invitation of Mons. Franck, Mons. Klary, and Mons. Boissonas, to go to the Maison Franck de Villecholles, 18, Rue Vivienne, Paris, and witness the demonstration of the process for themselves. We can assure them of a cordial and courteous reception, and the fullest aid in understanding the process. Seeing is believing, as the old saw has it; and nothing but seeing can give absolute assurance in such a case. No photographer who visits Paris should fail to make this call, whilst those who can manage ought to go, if to gain this experience alone. A knowledge of the French language is very desirable in Paris, but in examining this matter the demonstrations may be witnessed without even this aid.

THE DEBATE ON THE PERMANENCY OF CARBON PRINTING.

The debate on the permanency of carbon prints terminated at the Photographic Society on Tuesday evening. The issue has never been doubtful. It has never been supposed that it was impossible by perverse ingenuity to introduce fugacious materials into a pigment print which should render its change inevitable. Nor has it been doubted that, if to gain a temporary bloom, a changeable pigment were employed, such bloom would be temporary only. But it does not follow that if Wilhelmina gains a fleeting charm from rouge, that Wilhelmina has perished when the rouge has faded. Hence the true issue which has been under discussion was not really the permanency of carbon prints, but rather the durability of certain rosy tints which photographers desire to see in their productions. And even that issue has been tolerably clearly decided.

Two exceedingly interesting papers were read at the meeting on Tuesday evening; one on the nature and applications of alizarine, the finest and most permanent rosy-red tinctorial substance in existence, by Mr. J. R. Johnson, well known by his important contributions to the art of pigment printing, a gentleman who—as an old pupil of the renowned Chevreul, who, as a chemist and director of the Gobelin Tapestry manufacture in Paris, is probably without a peer in the chemistry of dye-stuffs—was pre-eminently well fitted for the task; and another by Mr. T. Bolas, a young chemist—enthusiastic, frank, and modest, on whose accession to the number of chemists interested in photography we congratulate photographers generally. The latter gentleman's paper was directed to an examination of Dr. Van Monckhoven's allegations as to the reactions of chromic salts in combination with gelatine and colouring matters. His researches lead to conclusions directly opposed to those of Dr. Van Monckhoven, and confirmatory of the generally received theories and results. His conclusions are in confirmation of the view we expressed to the effect that the sulphate of baryta suggested for addition by Dr. Van Monckhoven is responsible for the persistent yellow tint obtained by the Doctor, to which instability, as he alleged, was due. He finds the reactions follow which we suggested; the fact remaining, notwithstanding the Doctor's allegation that it was opposed to the most elementary principles of chemistry. In the trade interests and personal questions into which the discussion deviated, and which, unfortunately, seem to be almost inseparable from a discussion so materially associated with such questions, it is not necessary that we should enter here. That pigment printing really stands upon a safe basis, that pigment prints of the greatest beauty and of unchallengeable permanency may now be certainly produced, may be regarded as a settled question. We have recently tested very fine prints by the Autotype Company by exposure to prolonged sunlight during many weeks and found no change. The magnificent colours in the prints produced on Mr. Johnson's new tissue by Mr. Sarony, exhibited at the meeting, have received similar tests in our own hands, and those of others, without any trace of change. We have, on the other hand, before us prints,—received from a skilful carbon printer in America, who has entered with deep interest into the experiments suggested by this discussion,—made on Dr. Van Monckhoven's tissue, and on the Autotype chromotype tissue, in which change is distinctly visible. How these tissues were prepared, and under what circumstances issued, we have no means of knowing or suggesting. But it is probable that an explanation could be given, showing that the results were exceptional and unnecessary, and therefore in future, and in general, possible of avoidance.

POSING—*continued.*

BY W. HEIGHWAY.

Don't begin the pose until the very last moment. You should then have formed in your own mind a tolerably accurate idea of the best position for the head and shoulders, the view of the face giving the best reflection of the character, and the general idea for the picture.

The first care should be given to the outline of the picture, that it is in accord with the laws of composition. The outside lines of the figure are of very great importance, because the impression they produce on the eye is ever present. Faults of detail *may* be forgotten, or forgiven, or, it may be, not seen; but the outline cannot but be seen—especially if it is bad.

In a picture embracing the head and shoulders, or the figure to the waist, it will be found that, as the lines approach the pyramidal form, the effect is pleasing; an appearance of stability being apparent, without which a picture can scarcely be satisfactory.

The head should be of graceful poise, resting easily but firmly on the shoulders, not giving any appearance of having been wrenched and twisted into position, but looking as if the action were instinctive. See that the lines of the shoulders provide a good balance for the head.

Any one-sidedness of the head (speaking in this connection of the effect of the outside lines, not of the actual poise of the head) induces an unstable appearance, the lines deviating from the pyramid we have conceived as for the pose of our subject.

Preserve all curves giving an oval form to the head, restore when broken, introduce where wanting, and destroy or compensate all lines and angles in the arrangement of the hair, in the dress, or in the figure, which have the effect of marring an artistic *tout ensemble.*

Be careful that the figure "stands" well; strong, and properly sustained in every part, that no appearance of weakness or tumble-downness may spoil your design.

The rest is a matter of detail merely—lines to be balanced, supplied, or destroyed.

The action of the figure should be, as nearly as possible, that characteristic of the individual whereby is generally secured a pose easy, graceful, and life-like.

Don't go in for violent action. The figure of Ajax Defying the Lightning wouldn't, I feel sure, look at home in a modern cut-away coat and trousers—nor can the trousered being of to-day imitate such poses with any other effect than to look supremely ridiculous.

Avoid exaggeration. There is such an awful lot of it about, that really simplicity is doubly refreshing as a change.

As a rule, especially in the case of a youthful subject, the head should take a different direction to the body, whereby force and motion are given. Not too much of it, or you will find a strongly marked crease in the neck, to which objection is sure to be made.

The head may lean a little *towards the camera*, not the reverse, except with the female head, and perhaps for children. It will readily be seen that the head leaning away from the camera gives an appearance of weakness, a thing not desirable in the portrait of a man.

Completeness should mark your work—the head as the centre of interest, with every line composed in regard to it.

Artistically speaking, the face has two sides, so strangely different yet wondrously alike; and several views. To select the best side we must judge of the several features, and mentally strike a balance between them.

Perhaps one view of the nose is positively delicious; ah! but you see the mouth on that side has an awkward downward twist; and, now we come to look at it, this eye is not nearly so good at the other.

Well, here are a few rules for your guidance—safe enough as rules go.

The forehead.—A high forehead had best be foreshortened by depression of the chin.

The eyes.—Where unequal in size or height, no objection offering, take the larger or higher. With large and staring eyes, the gaze should be lowered a little; small or partially closed eyes should be directed to look slightly upward, or in the full face view depress the chin somewhat, and direct the gaze rather above the top of the lens. Blue or light eyes turn *from* the light; deep-set eyes require plenty of front and but little top-light, the top-lights creating shadows under the brows. A defective eye should not, of course, be taken, if it is possible to avoid it.

In the full face view the eyes may look into, or just above the lens—the body should be, more or less, turned away; rarely both body and face taking the same direction.

For persons accustomed to the use of glasses, frames without glasses of various kinds should be provided. Sometimes it happens, where the sight is very weak, that the sitter cannot do without the glasses, when care must be exercised to guard against the reflection of the light on the surface of the glasses, and against refraction of the features through them.

The nose is rarely perfectly straight, oftentimes giving an entirely different character to each side of the face. The *nez retrousse* requires a depression of the chin, or a pointing down of the camera. Round and flat noses should be taken from the front.

The cheeks.—High cheek-bones and sunken cheeks require front lighting, or should be taken in profile. A swollen cheek should be avoided or hidden by the hand, a fan, a flower, &c., &c. Wrinkles may be greatly reduced by lighting from the front.

The mouth.—Where small, take in full view; large, in profile. Open mouths are always awkward; taken naturally they are not prepossessing, closed they have a tightened appearance, which is anything but pleasant. See what the introduction of a flower, fan, or the hand, to partially or entirely hide the mouth, will effect.

The hands are not, generally speaking, handsome adjuncts to the portrait. Men, especially, do not know how to carry them, and the less they are seen the better. At all events, where introduced, they should be kept back in tone and importance as much as possible.

Turn the *edges* to the camera, not the breadth. Carefully guard against distortion of bare arms by pressure against chair or table, the effect of which is most unpleasant in loss of contour, and the gain of flattened unshapeliness.

These few simple hints may be useful if regarded as suggestions rather than rules, leading the intelligent photographer to discover for himself many other means whereby to secure pleasing and artistic effects—and the avoidance of defects.

Posing is in itself an art, requiring a keen and lively perception of the beautiful, as well as knowledge of the laws governing art.

Too many photographers have one pose for male sitters, and (perhaps) another for female; who seem to say—

Hullo! here's a man, and here's his pose; now fire away—or here comes a woman, let her sit down, so; thus all day long, the same thing over, and over, and over again, drearily and soullessly. This is how *not to do it.*

We must depend rather upon judgment and impressions than on rules, however good; and remember, our best impressions are formed when we see through, not with, our eyes.

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SEVERAL NEGATIVES ON SAME PLATE.

BY MONS. A. DURAND.

I take this opportunity of bringing to your notice a plan which I have adopted for several years for taking several views on the same plate and with the same dark slide. As in the arrangement described by Mr. Brown, in the number of your journal of the 3rd of the present month, I take a sheet of cardboard and place it in front of the ground glass or of the dark slide. In the apparatus which I employ, in the invention of which my friend M. Blachon is associated with me, we cut out one of the quarters of the cardboard, and as this is of a square shape, we can, by trimming it in every direction, obtain four pictures on the same plate. We are of opinion, however, that our contrivance is an improvement on that of Mr. Brown, and as we have employed it for a long time we send you a description of it.

A square sheet of cardboard, which can be placed in front either of the ground glass plate or of the dark slide, is cut half away, the other half being left in the manner indicated in the accompanying figure 1, where the shaded portion represents the part which is entire. In the portion cut away, A, two cardboard shutters are made to slide in turn by means of grooves as shown in figure 2. If a quarter-plate picture be required, the shutter C is drawn back, and the other one, D, left closed. If the right-hand picture be required, then C is closed and D opened. For pictures on the lower half of the plate it is merely necessary to turn the cardboard upside down; the shutters are then below, and the entire portion above. If it be wished to have a half-plate picture, both shutters are drawn open, as in figure 3. Again, by turning round the cardboard with both shutters open, as in the same figure, a half-plate picture is obtained on the lower half of the plate. By opening the shutters and placing the cardboard as shown in figure 4, an upright picture on half the plate can be produced. Lastly, if the size of the dark chamber of the camera admit of it (the one we work with has an inside measurement of 18c. by 18c.) we can with the same arrangment take two stereoscopic views, one on the upper, the other on the lower half of the plate.

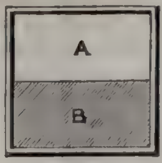

Fig. 1.

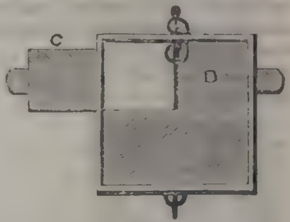

Fig. 2.

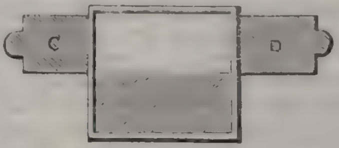

Fig 3.

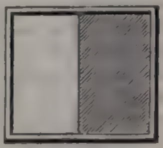

Fig. 4.

With a single objective no alteration is needed in the apparatus which I have described; but if two objectives are used for taking instantaneous stereoscopic pictures, a division of rather strong black cloth (A, figure 5), must be fixed inside the camera, attached by a hook, C, to a loop in the slide which carries the objective, and at the other end to the sheet of cardboard by a needle passed through two eyes, as in figure 2. After this description it is easily seen that in order to draw the shutters there must be a longitudinal slit cut with the saw in each side of the camera, and that the

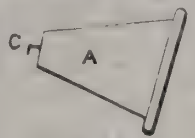

Fig. 5.

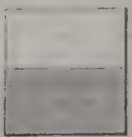

Fig. 6.

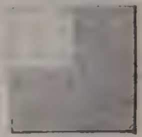

Fig. 7.

edges of these slits must be lined with cloth to prevent the light from penetrating.

If it be desired to get rid of the inconvenience of the shutters requiring the alterations of the camera which I have just described, the same result may be obtained by using two sheets of cardboard (whose weight is insignificant) cut one as in figure 6, the other as in figure 7. Either of these may be used according to the kind of picture which has to be taken.

I should have concluded my communication with this description of these convenient contrivances, if I had not to reply to an objection of which Mr. Brown does not seem to have thought—I mean as to the position of the objective. If I rightly understand the account that he gives of his invention (Photographic News, p. 209), he intends the objective to occupy always the centre of the front board which carries it. Yet it seems clear that a photograph can only be accurate and harmonious when the objective is placed opposite the centre of the picture to be taken. We have consequently modified the front board of the camera in the following manner:—Let A,A′,A″,A‴ (fig. 8) be the front of the camera, having a circular opening in the centre. Let B be a circular disc which can revolve in this opening by means of grooves. The disc B carries an arm, C C, turning on a pivot, O, and having at its extremities the two objectives D and D′; or there need be only one objective. The disc B, is pierced by a circular hole to fit these two objectives.

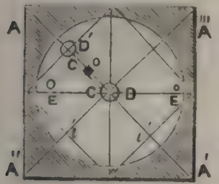

Fig. 8.

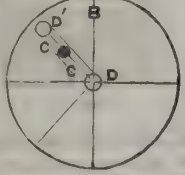

Fig. 9.

Now for the method of working with the apparatus. To take a quarter-plate picture on the left-hand side of the circular disc B (fig. 8) is turned so as to get the circular hole fitting the objective D′ on the diagonal A A′. It will be seen that the objective will then be exactly in the centre of the picture which it is proposed to take. The method is similar for all the other pictures: revolve the disc B so as to bring the hole fitting the objective which is on the arm C C directly on the centre of the picture to be taken. Two brass studs, E E, fixed on one of the diameters of the disc B serve to communicate to it the necessary circular motion.

If it be required to have one of the objectives in a central position, all that is necessary is to give a half turn to the arm *cc* on its axis *o*, so that the objective D′ takes the place of the objective D, and *vice versa*. When one objective only is used, one of the extremities of the arm *cc* must be kept entire, but, of course, there will be still the two circular holes in the disc B, one in the centre, the other near the circumference, and in front of them will be the objective carried by the arm *cc*.

For taking instantaneous stereoscopic views the slide can be furnished with the objectives fixed at *ii*. With them a double picture can be taken on the lower half of the plate, and then, by turning the slide half round, another view on the upper half. When these two objectives are not in use, they may be left in their place, and they will not interfere with the working of the apparatus; or they may be removed, and the holes closed by caps or some kind of shutter.

I regret that I have been compelled to give you so lengthy a description of my instrument; I should have been satisfied to have sent you the one which M. Davanne published in 1874 at page 125 of the *Bulletin de la Societe Francaise de Photographie*, were it not that since that time my friend M. Blachon and I have made several improvements in the apparatus. I shall be glad if the description I have sent be of service to any of your readers; I should in that way be able to repay to some extent the debt of acknowledgment that I owe to your journal for many excellent formulæ that have appeared in it since I have been a subscriber.

Correspondence.

A. BRAUN AND CO.

Dear Sir,—Permit us to thank you most sincerely for the very flattering remarks you have made in your esteemed journal of May 31st, on our photographic exhibition in Paris. We would, however, call your attention to the fact, that it has only been completed within a week. Since then we have exposed a print—of course in carbon—of the somewhat uncommon dimensions of two metres by one metre forty cent., representing the temple of the Medicis in Florence. This print is in *one* sheet, a double transfer, and, we believe, the largest ever made. Besides, you will remark some phototypes of fifty-five by seventy-five centimetres, printed by the steam press—"Schnellpressen-Lichtdruck," as they are called in German, or "Impressions aux encres grasses," as in French.

But it is not our purpose to dwell on this subject (this we must leave to the men of the profession), but simply to answer the question in parenthesis: "Is not Alsace in Germany now?" Most certainly, sir; the village of Dornach, where our mother establishment lays, and which you have honoured with your visit ten or twelve years ago, belongs to annexed Alsace, but the character of the house, which shows itself in its reproductions, is still essentially French, and it was for this reason that the originator of the firm, the deceased Monsieur Adolphe Braun, has founded two branch firms in Paris, one for the sale in the Avenue de l' Opéra, and the other for the manufacture, printing, and posing on the Boulevard des Capucines. We think, therefore, that we are at perfect liberty to exhibit, and we shall be most happy if you will yet examine the additions referred to above.

Will you, dear sir, kindly allow to this a space in your valuable News, and believe us, yours most respectfully,

Adolphe Braun & Co.

PHOTOGRAPHY AT THE PARIS EXHIBITION.

Dear Sir,—As the remark of your Special Correspondent in last week's News may perhaps cause some dissatisfaction to those exhibiting at Paris, I should like to give an explanation, and which I trust will convince them that they have not been so badly used.

On my arrival in Paris, about a fortnight before the opening, I saw nothing had been done in the photographic department. I therefore volunteered my services to Mr. Cunliffe Owen, so that, if possible, the photographic section should be ready by the opening day. He accepted my proposition, and through Captain Harris placed the hanging entirely in my hands, and gave me full liberty, and rendered me every assistance. Therefore I took the entire responsibility of arranging the exhibits, and any blame, therefore, must be laid to my charge; but I trust some allowances will be made for the difficulties I had to encounter.

With regard to the unfinished appearance your correspondent mentions, the photographs having to be hung on screens ten feet by eight, I endeavoured, as far as possible, to keep each exhibitor's works together, and, where it could be done, gave a screen to each, so that all should show to advantage. This I thought would be more satisfactory than crowding as many pictures as could be placed on the screens, although, in some instances, it caused a want of uniformity. I also, with each exhibitor, placed his best works on the line.

With regard to the position we occupy, I do not think photographers ought to complain; it is a very prominent place in the British section, close to the fine arts, and in a part most frequented, certainly better than the garret at 1862 Exhibition, where, perhaps, only one out of many hundred visitors could find the way. The principal objection to the locality allotted to us in Paris is, that we have too much light. This Captain Harris promised should be remedied by stippling the glass over; in fact, it would have been done at first, but every hand was so occupied that men could not be found.

I am sorry to see so few British exhibits, only thirty-two, whereas the French number nearly two hundred; the British Commissioners could hardly afford to build a separate place for so small a number. It is true that the French have a gallery to themselves, but have to pay dearly for it, I believe thirty-five francs per metre, some having a large space costing from thirty to forty pounds, and almost fabulous amounts they have spent on framing their pictures. In portraits they make a very fine display, but in landscapes they are very poor, with hardly a single exception.

In conclusion, I must add a word of praise, and the thanks of every photographer is due for the great interest Mr. Cunliffe Owen and Captain Harris have taken to give satisfaction to every one, not only in the photographic, but every department.

Apologising for the length of my letter—I remain, sir, yours truly, W. England.

PHOTOGRAPHIC BIBLIOGRAPHY.

Sir,—As far as I am aware, no considerable work on the bibliography of photography has yet appeared. Photography has now, however, attained such vast and various development, that the utility of such a compilation to those interested in the different branches of photographic reproduction and kindred matters will scarcely be contested.

It so happens that I have rare facilities for compiling a nearly complete catalogue of all works on photography which have been published in the British Isles, together with very many from all parts of the globe, besides a vast quantity of notes—the accumulation of years. The plan I propose to follow would be to divide the list, as far as possible, according to the different branches of the subject, as general works on photo-chemistry in relation to photography, optics of photography proper, dictionaries and repertories of P., Daguerreotype, heliotype, photolithography, P. zincography, encaustic P., medical P., criminal P., aesthetics of P.; portrait, genre, landscape, reproductions, &c.; giving, as far as possible, the character of the book, price, place of publishing, size, whether illustrated or not, &c. Such a compilation would not be very large, and might be sold for a shilling.

If I were assured (either through private communications or otherwise) that the demand would be sufficient to cover the expenses of printing, I would willingly give my labour to the undertaking, which, indeed, is already commenced. The proposal stands on its own merits, which seem sufficient to warrant me in asking for it the publicity of your columns —I am, sir, yours obediently, N. N.

17, *Ellington Street*, *Liverpool Road*, *London*, *N.*

[The value of a catalogue *raisonne* of photographic literature would doubtless be interesting and valuable; but whether the demand would be sufficient to pay for the necessary outlay of production, it is impossible at present to say. Possibly those approving the project will communicate with our correspondent.—Ed.]

Proceedings of Societies.

Photographic Society of Great Britain.

The last meeting of the session of this Society was held in the Water Colour Gallery, Pall Mall East, on the evening of Tuesday, June 10th, Mr. J. Glaisher, F.R.S., in the chair.

Before the proceedings were commenced the Chairman introduced to the meeting Lieut. Darwin, R.E., who had consented to undertake the duties of Honorary Secretary to the Society, *vice* Mr. H. Baden Pritchard, who had retired.

The minutes of a preceding meeting were read and confirmed.

The Chairman, referring to the allusion in the minutes to the death of the late Mr. J. R. Spencer, said he had had a letter from Mrs. Spencer thanking the Society for the expressions of condolence at the last meeting.

Mr. T. Bolas then read a paper on the "Alleged Fading of Carbon Prints," in which he gave testimony in refutation of the allegations of Dr. Van Monckhoven in his recent paper on this subject.

Mr. J. R. Johnson then read a paper on the "Nature and Applications of Alizarine." This paper and the preceding one will appear in our next. Mr. Johnson showed examples of alizarine and of dyed fabrics produced by its aid.

Mr. Pearsall referred to the use of calcareous waters as possibly causing a formation of chromate of lime.

Mr. Sawyer thought that the Autotype Company was, by implication at least, attacked unfairly in Mr. Johnson's paper, and proceeded to defend it, and was followed by Mr. Bird with the same end.

As the observations in the absence of the paper would possess no interest, we defer them until our next.

Mrs. Fry thought that nobody would suppose that the paper of Dr. Van Monckhoven had really created any general doubt of the permanency of carbon prints. It seemed to him that the Doctor, being just about to commence a commercial enterprize in carbon tissue, thought it necessary to do something to gain attention. In doing this he had made statements which it was a great pity had been made. He had found that certain prints—probably made on his own tissue—had faded, and hence he had made general statements which could not be fully borne out.

After a reply from Mr. Johnson, and some votes of thanks, the subject dropped.

Mr. Werge exhibited some prints from negatives taken on Swan's rapid dry plates. The subjects were children, in one case a child and rabbit, all showing great rapidity.

The Chairman announced that the Council had completed arrangements for the next Exhibition, details of which would shortly be in the hands of members. Mr. Warnerke had, he said, prepared an interesting paper; but, as his illustrations would require much wall-space, and the walls were now covered by the water colour paintings, the paper would be postponed.

The proceedings then terminated.

Liverpool Amateur Photographic Association.

The usual monthly meeting of this Association was held on Thursday evening, the 30th ult., at the Free Public Library, William Brown Street, Mr. H. A. Wharmby, President, in the chair. The minutes of the previous meeting were read and confirmed.

Mr. W. E. Potter exhibited two prints from the same negative, the one being so decidedly superior to the other that Mr. Potter was asked to explain how the difference arose. He said that on varnishing the negative it proved insufficiently intense, giving a weak print with no contrast. Following the advice of the President, he heated some alcohol by placing the bottle in hot water, and when sufficiently warm poured the alcohol on and off the negative until the varnish was all dissolved off the plate. When this was the case—which he ascertained by dropping a drop into cold water without producing milkiness—he proceeded to intensify the negative while still wet with pyrogallic acid and silver in the usual manner. He (Mr. Potter) found no difficulty in taking off the varnish and intensifying, and was delighted at the manifest improvement of the negative, to obtain which he had carried his camera a bicycle journey of over forty miles.

The Rev. T. B. Banner exhibited some prints from Liverpool collodio-bromide plates which had been prepared ten years ago. They developed easily, and showed excellent keeping qualities without having lost their sensitiveness.

It was decided to defer the visit to Speke Hall until July, when an excursion could be made there instead of the usual monthly indoor meeting.

Several of the members related their photographic experiences at home and abroad, and the meeting was adjourned until the 27th inst.

Edinburgh Photographic Society.

The second out-door meeting for the season was held at North Berwick on Thursday, 31st May.

The party left Edinburgh by the 7 a.m. train, arriving at North Berwick about 8.30, where, having partaken of breakfast, a conveyance was obtained, and a start made for Tantallon Castle. The weather was simply beautiful, the drive through the delightful country being most heartily enjoyed. On reaching the castle, a number of plates were exposed, and the party then proceeded to Tynningham, the seat of the Earl of Haddington. The members were amply repaid, for a more beautiful place they have never visited. Some very choice bits were secured in the woods, and with these, and the mansion in its magnificent grounds, the supply of plates soon became exhausted.

A return drive of seven miles made the party enjoy a substantial and "towsy" tea at North Berwick. Edinburgh was reached about 8.30 p.m., all being delighted with the day's out.

The eighth ordinary meeting of the session was held in 5, St. Andrew Square, on the evening of Wednesday, June 6, Mr. **Lessels** (President) in the chair.

The following new members were unanimously elected:—Messrs. W. Jenkinson, P. Conning, J. R. Cooper, J. T. Gerard, Ross, Henry White, Peter Ferguson, and James Abbott, Jun.

A number of very beautiful prints from negatives produced at the recent out-door meeting at Tantallon Castle and Tynningham were handed round for inspection, and were much admired. It was urged by several members present that, if possible, transparencies for the lantern, from the best negatives secured at these interesting trips, should be prepared, and become the property of the Society. It was maintained that very great interest would specially attach to these works of the members from their local and personal associations, also because many of them are unique, unobtainable elsewhere, and of very high artistic value. If such a project could be conveniently carried out, the Society would soon be possessed of an extremely large and valuable series of transparencies, available for "popular evenings," and accessible to individual members for illustration and entertainment. The difficulties in the way of securing uniformly high-class transparencies suitable for the lantern require that some members make this work a speciality, in order that justice be done the negatives, and that they be a credit to the Society as a large and influential body specially devoting its energies to the advancement of photography. It was understood that several members would make experiments towards attaining this end, that by the time the next session opens some simple and reliable method might be perfected, providing a soft pleasing colour and delicate rendering of every subtle detail.

The presentation prints were next distributed to those members who were present, and it was agreed to send a copy to other kindred societies, and also a copy to the Editors of the two English papers devoted to photography.

Mr. W. **Nelson**, in a few graceful remarks, proposed a vote of thanks to Sir Noel Paton for his permission to reproduce the picture forming the subject of the presentation; this was seconded by Dr. Hunter, supported by several other members, and unaminously adopted.

A vote of thanks was then most heartily accorded to Mr. Davies for the beautiful way in which he had printed the pictures and the tasteful manner in which he had mounted them. In reply to a question as to the mounting, Mr. Davies said that the trimmed carbon prints were mounted upon a suitably tinted cartridge paper that had previously been stretched damp upon a board and allowed to dry. When the carbon print was dry, this cartridge paper was cut out with appropriate margin, and the whole remounted upon the thick cardboard as seen. From his great experience he was justified in holding this to be the best way to finish large prints, the beauty of the result amply repaying the extra time and labour involved.

Some conversation next took place concerning the ferrous oxalate developer, the coming out-door meetings, and the next annual holiday and trip, when a vote of thanks to the chair terminated this, the last meeting of the session.

Photographic Section of the American Institute.

At a meeting of this Society, **President Newton** in the chair, the minutes of last meeting were read and approved.

The **President** said: One of the impediments in the way of working emulsion had been the difficulty in making uniform samples. Samples made to-day and others made to-morrow with the same chemicals and formula might not produce like results. Such variations in photographic processes are not, however, exclusively confined to emulsions. This objectionable feature has been overcome by the peculiar method now adopted in the manufacture of my emulsion. The question was raised here, and generally assented to, that emulsion or bromide of silver plates were not as sensitive to weak light as bath plates. That is almost the universal experience. Dr. Vogel alluded to this fact in an article which he wrote a year ago and published in one of the European journals. As I have stated before, in my experiments, the bromide in this respect differs not a whit from iodide. The first collodions were made with iodide alone, and it was years after the introduction of bromide with the iodide in this country before it was adopted in England. I have experimented with those two salts and their compounds in every conceivable way. I found that bromide and iodide used separately were almost identical in sensitiveness to weak light. Iodide alone is not sensitive to the weaker lights—it works strong in the high lights, similar to bromide; but when a small portion of bromide is added to the iodide, the action is entirely different from what it is with either one separately, and the maximum benefit does not depend upon the large quantity of bromide, but the reverse. If you mix them in equal parts, you get no benefit from the bromide. With bromide emulsion the same fact is true in reference to the iodide in conjunction. That fact was perhaps elucidated fully here by a committee of this Section, which was appointed three years ago last fall to investigate a process brought to this country by a Mr. Hammenstede, who came here from Japan, and who made a bromo-iodide emulsion. The question of the union of these two constituents is not the only important thing for the best results; it is the way in which the emulsion containing them is compounded. I claim that my emulsion, as now being made, is as sensitive to weak light as any bath plate that can possibly be made. In making these copies (shown here), negatives on 8 by 10 plates, and prints from the same illustrative of this fact, I took three different kinds of engravings, one that was nearly black, another with very delicate contrasts, and still another with very strong contrasts, to show that emulsion properly compounded would work on all of them, and give all the detail in the shadows or dark places in the engraving that it was possible to get by any process. When it will do that it approaches perfection.

Mr. **Chisholm**: How does that emulsion seem to keep?

The **President**: It keeps indefinitely. I exhibit two portrait negatives; time of exposure, eight seconds. One I arranged so as to have very deep shadows, in which you will find no lack of detail. These negatives are just as they were developed and fixed. With the bath plate I could not have made negatives showing the same exposure in less than twenty-five seconds. With this emulsion I will do anything you can do with the bath plate, and in one-third the time.

Mr. **Bierstadt**: I accept the challenge, though I have never seen the negatives and prints, exhibited here by the President, excelled by any photographic process, if equalled.

The **Secretary**: These pictures are very beautiful; the details in the shadows and high lights are as finely rendered as I ever saw them. I cannot suggest any improvement; they are perfect.

Mr. **Chisholm**: Are you able to combine the iodide well with this bromide emulsion?

The **President**: Yes; I have used bromide three parts, and iodide twelve parts, and all the way from that extreme up to the fraction of a grain of iodide to twelve of bromide in almost every conceivable proportion.

Mr. **Chisholm**: The iodide has a clearing property; it makes a negative very brilliant and clear; it does not fog.

The **Secretary**: I find in the Photographic News for March 15th a report of the meeting of the Edinburgh Photographic Society, and in their minutes a communication from Rev. H. J. Palmer read by the Corresponding Secretary. I wish to read one or two clauses: "An experience of several years of this process (the emulsion process) has convinced me (the writer) that the very rapid emulsions which are at present in vogue were steps in the wrong direction, as great rapidity and reliability do not go hand in hand. . . .

The **President**: In the article which the Secretary has read we find the expression of an idea, which has always prevailed among photographers, not only in reference to emulsion processes, but to all photographic processes, viz., as one approximates towards the maximum degree of sensitiveness, just in that ratio he would depart from certainty. That idea is not only applicable to emulsion, whether of gelatine or collodion processes, but to all photographic processes.

The Secretary: Probably that idea has originated and been sustained with and by the fact that a departure from the proper time of exposure with a rapid working process, if it is very small, shows more than a very much greater departure would with a slow process. I see no chemical reason why a quick process should not work as certainly as a slow process, provided you can work proportionately close to the proper time.

The President: Here is an illustration, a print from a negative exposed twelve seconds; it is an over-exposure. If I had been working a process which would have required at least twenty-five seconds' exposure, four seconds more or less would not have materially affected the results. Now with a process in which only eight seconds is necessary, to give it twelve increases the time thirty-three and one-third per cent. That is just where the difficulty, in my estimation, lies, in reference to the uncertainty with quick processes; you cannot have the latitude that you have with slow processes.

The Secretary: Our English brethren seem to have given considerable attention to gelatine emulsion. The pictures by the gelatine process, though I have not seen a very large number, have usually shown a grain on the print, as though it was in the negative film.

Mr. Bierstadt: I have seen the plates just as free from grain as I have ever seen with collodion. I have some Kennett's gelatine pellicle that I think is just about as rapid as Newton's emulsion.

Talk in the Studio.

South London Photographic Society.—The last meeting of this Society, held on the evening of Thursday week, was devoted chiefly to a discussion and revision of the laws. The President's annual invitation to the members to spend the evening of the last Saturday in July was announced, and members will receive due intimation by circular note.

Lens Forgeries.—A very impudent example of forgery was recently brought under our attention. A provincial photographer, who had purchased a second-hand Dallmeyer's lens, sent it to that maker to be "done up." The first sight of the instrument to a practised eye bespoke its lack of genuineness. The brass-work was quite unlike. It bore, however, an engraved name, letter, and number; but the name was spelled "Dallmyer" the *e* and the *y* being transposed. Intending purchasers of second-hand examples of such lenses would do well to ask the maker to verify the instrument before they complete the purchase.

Photographing Copyright Engravings.—At Lambeth, Albert John Sanders, of 2, Albert Terrace, Church Road, Upper Norwood, appeared to five summonses taken out by Mr. Benjamin Brooks, fine art publisher, of 171, Strand, for having, without his consent, sold photographs of engravings of which he had the copyright. Mr. T. Duerdin Dutton appeared for the defendant. Mr. Brooks stated that he had spent thousands of pounds in the purchase of works of art, and it certainly was hard to find persons making photographs of many such works, and selling them for a few pence. Such a system was extensively carried on. Evidence was then called proving the purchase at defendant's shop of photographic copies of engravings entitled "Patience and Tribulation," "The Emigrant's Farewell," "Obedient to the Law," "Saved from the Wreck," and "Brittany Cattle," all being the copyright of complainant. Mr. Dutton, after some discussion as to the law on the matter, said his client would plead guilty, although he did not know he was doing wrong at the time. He wished also to state that the defendant was in great pecuniary difficulties, and unable to meet his creditors. Under such circumstances he appealed that whatever penalty was imposed it would be a small one. The complainant said he had no desire to press severely upon the defendant, but for his own protection, and that of fine art publishers, it was necessary a check should be put upon such an improper system. Mr. Chance said everyone pretty well in a trade like defendant's must know pictures like those produced were copyright, and it certainly was very hard upon those who, like complainant, spent large sums of money in such valuable works, to have copies made by means of photography and sold for a few pence.—He ordered the defendant to pay a fine of 20s. on each of the five summonses.—*Daily News.*

To Correspondents.

W. H.—The loss of intensity which at times follows on the operation of varnishing a negative is very troublesome and disappointing. It only happens under certain circumstances which are easy to understand. Whenever the deposit is of an extremely loose or porous nature, it follows that, on saturating it with a transparent gum-resin, it must lose in opacity or density. The deposit of a mercury salt in intensification is generally of a powdery and porous nature, and the natural effect of saturating such a deposit with varnish is to make it more transparent, the increased transparency being in greater ratio where the porous deposit is greatest, namely, in the densest parts of the negative. The best plan is to avoid the conditions by shunning those methods of intensification which give a porous absorbent deposit. When such negatives have to be varnished, the best method of avoiding the defect is to use a thin varnish, which will give a sufficient coating to bind the loose particles and preserve the negative from scratching, but insufficient to thoroughly saturate them and leave a glossy surface of varnish. A thin varnish will in such cases dry somewhat dull and flat, but instead of reducing the intensity, it will practically add a little to it.

P. S.—It is desirable that the hyposulphite bath for fixing negatives should be strong—one ounce of the salt in each ounce of water is a good strength. For fixing prints we prefer four ounces of hypo in a pint of water, and about fifteen minutes, immersion. Much, however, depends on circumstances. A thick, hard paper, will require longer than a thin, soft paper, and in cold weather, when the solution is cold, a longer time is required than when the temperature is higher. Vignetted prints, and all prints containing much white paper, where, of course, there is more chloride of silver unreduced, require more fixing than well covered prints.

Background.—The colour of the background is not of vital importance, but we prefer a grey tint, inasmuch as it affords easy facility for estimating the depth of tint which will be produced in the negative. If painted in ordinary oil colours it will dry with a gloss more or less; and as this gloss will reflect the light, you will have light white looking patches in the background of the picture. Nothing is better than what is termed "oil flatting," which consists of oil paint mixed with a very small trace of oil, and diluted with turpentine for use. It requires skill in application to get a good result. A small portion—say, a superficial foot of the screen—should be covered and completed at a time, as it dries rapidly, and should not then be disturbed It is best applied with a stippling or stabbing motion of a large well-worn brush. For water colours or distemper, size is the best vehicle. Starch might answer, but we have never tried it. Your patchy screen must be recoloured either with distemper or oil flatting.

G. L. S.—The reason why albumen is more suitable than gum or gelatine or other similar substances for giving a fine surface to paper for silver prints is obvious. The substances you name are soluble in water, and are not coagulated or made insoluble by contact with nitrate of silver. Paper coated with these substances would have its surface injured and partially removed by floating on the nitrate bath. But albumen, being coagulated by nitrate of silver, at once acquires a hard insoluble surface; and moreover, forming a combination with silver, it helps to form and gives vigour to the image. Whether albumen has or has not contributed to the fading of silver prints is not an absolutely settled question. A serious indictment against it has often been presented, and with some evidence; but the question has never been definitely solved.

E. H. D.—Many thanks for interesting examples and statements of experience, which are useful to us.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. Allanson, Bridlington,
Two photographs of Rev. R. P. Blakeney, D.D.
Mr. Lord, Huddersfield,
Two photographs of Henry Vincent.

The Photographic News, June 21, 1878.

ON ALIZARINE: ITS ORIGIN, PROPERTIES, AND APPLICATIONS.

BY J. R. JOHNSON.*

The English traveller who visits for the first time the South of France, and particularly the fertile district round Avignon, will be surprised at seeing large tracts of land covered with the foliage of a plant entirely unknown to him. On enquiry, he will find that this novel agricultural product, so largely cultivated, is the celebrated garance, the "Rubia tinctoria" of botanists, and the madder of the English calico printers,—one of the most important of their dye-stuffs.

In France it is very largely used to dye wool of the red tint so well known, in consequence of the trowsers of the French army being made entirely of cloth dyed of that colour; so that, with our neighbours' "*porter la garance*," "to wear madder," is synonymous with being a soldier or becoming a soldier.

It is also used for dyeing the red, purple, and blacks of our Bandanna silk handkerchiefs; the fast purples and pinks of our cotton prints; the perfectly permanent red, pink, lilac, chocolate, and black tints of our often gorgeous furniture prints; and lastly, it furnishes colouring matter of the brilliant and universally appreciated Turkey red.

The colouring principle of the plant resides chiefly in its roots; these are taken up from the ground at the proper season, are dried, and are sent to market, either in their natural state, or ground to powder and packed carefully in air-tight casks.

France and Holland send us large quantities of ground madder; from Greece and Turkey it comes to us in its more natural state, under the title of alizari, by which it is known all over the Levant; hence, when the colouring matter of this dye-stuff was first isolated, it received the name of alizarine.

It would waste your time and try your patience to describe in detail the various processes by which these brilliant tints are produced from this apparently colourless, or but little coloured root, although to a chemist they are highly interesting and instructive. It will suffice our purpose to say that they consist—

1. In operations by which the colouring matter is converted from a dormant or merely potential state to one of activity, just as starch and dextrine are converted into sugar by diastase, and by an analogous action and transformation.

2. In fixing of the colour on the fabric, by first impregnating it totally when it is to be dyed, but only superficially or topically when it is to be printed, with a base or mordant, and when this is fixed within or upon the textile fibre by saturating it with alizarine, in an infusion of madder roots gradually heated to boiling point in a bath formed of an infusion of madder roots. For red and its various shades—such as pink and rose—the mordant employed is a salt of alumina, and usually the acetate; when violet, purple, or black is wanted, the acetate of iron is used—very feeble solutions giving the former tints, and strong solution the latter. For chocolate, brown, and maroon, a mixture of the two acetates is employed, the proportions varying with the shade and depth of colour.

3. In the clearing, purification, or development of the true colour from the brown matters with which it is associated, by treating the dyed cloth repeatedly with boiling soap lye and solutions of hypochlorite of lime or soda alternately, the brown matters are attacked by these reactives, and are removed or destroyed, while the alizarine compounds to be fixed on the cloth are only purified, and enhanced in brilliancy of hue.

When we say that, before Berthollet discovered the value of chlorine in dyeing, madder prints were exposed for several days upon the grass between each treatment with boiling soap, it will be seen how highly resistant the alizarine pigments are to light, which bleaches so many colouring matters.

Alizarine is not only one of our most important dyestuffs, but it is also the colouring principle of many of the most delicate, the most brilliant, and, at the same time, the most permanent tints of the artist's palette, whether he employ oil or water as his vehicle or medium.

You see before you some fine specimens of madder lakes, kindly lent to us by Mr. James Newman, the principal of that celebrated firm:—

1. You have here brown madder, which will give you some idea idea of the natural colour of madder lake before the clearing processes have been applied thereto, although in this case the base is neither alumina nor iron.

2. Here you have Rubens madder, a fine red, alumina being the base.

3. Here you have purple madder.

4. Here the splendid tints of rose madder, pink madder, &c., of which the base is also alumina.

The pigments you see here only differ from those on the fabric by the fact that the mordant or bases are in one case attached to or sealed, as it were, within the cells of the textile fibres; while, in the case of the pigments, these bases are free, and combine directly with the colouring principle, as in any other chemical species. The combination is usually effected by dissolving the colouring principle in a solution of alkali, and adding thereto a soluble salt of the base. The base and colouring matter are precipitated together, and the compound so formed is called a lake. This name originated from the fact of the soluble colouring matter of a particular species of coccus which the natives call "lac" (Coccus lacca), which was sent to us from India in a dry portable form when so precipitated under the name of lac-dye.

Nothing is more easy than to prepare these lakes, yet few things more difficult than to obtain them of the brilliance and purity of the specimens before you, a valuable trade secret.

Even to make an inferior article the madder must undergo—

1. A series of washings to get rid of the soluble impurities when the insoluble colouring matter has been developed.

2. The extraction of the colouring principle, and its precipitation combined with a base.

The preparation of the lighter shades of madder lake is greatly facilitated by the fact that a solution of alum, and particularly alum made neutral by the addition of an alkali until the alumina begins to precipitate, dissolves readily a quantity of alizarine, forming a solution of a fine cherry red colour, from which acids precipitate the alizarine in nearly a pure state, while alkalies and their carbonates precipitate it as pink or rose lake.

The necessity of the long and costly operations for the purification of the madder colours, whether as dyes or pigments, induced many chemists to endeavour to effect the isolation of the colouring principle in a pure form, so that by using the pure extract instead of the complex natural product, the tedious operation of purification might be dispensed with. Robiquet, a French chemist, first published the results of his researches. He believed that madder contained not one essential colouring principle, but two, to which he gave the name of alizarine and purpurine respectively, evidently modifications of one substance. Although Robiquet failed to establish the extraction of the pure colouring matter as a practical manufacture, he nevertheless obtained it in an intermediate or partially purified state, which, under the name of charbon-sulfurique or garancine, became subsequently a most important article of manufacture and commerce.

This manufacture was founded on the fact that the colouring principle of madder dissolves readily, and without change, in sulphuric acid, and is precipitated therefrom by water. It was only necessary, therefore, to reat he powdered madder with the acid, and throw the mass into water, to obtain the colouring matter, mixed with carbon, the acid having destroyed or rendered soluble all the other components of the plant.

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* Read before the Photographic Society of Great Britain.

A long list of chemists might be given, each of whom contributed somewhat to our further knowledge of this interesting subject, but all these researches were thrown into the shade, and the importance of the plant itself greatly diminished, by the discovery of a German chemist that alizarine could be manufactured artificially out of a product of coal tar. The changes rung upon the elements of pitch, by which that substance is converted into a splendid colouring matter we have been discussing, are of the highest interest to the chemist, but we have not time to consider them; suffice it to say that the process is thoroughly practical; is performed successfully on thousands of tons of the raw material; and is already, although in mere infancy, a most important manufacture.

By means of scientific research, so often sneered at by practical men, we thus arrive at a process by which a bit of coal can be converted into the substance which yesterday we only obtained by careful preparation of the soil, by skilful husbandry, by careful manipulation in drying, and grinding and packing, and by sundry elaborate operations, the result of the labours of many minds. May we not consider the artificial preparation of alizarine as one of the greatest triumphs of modern chemistry?

The practical photographer will naturally ask, How does all this affect us? What have we to do with alizarine and artist's pigments? We reply, that since the introduction of photographic pigment printing, every photographer who has adopted the new system has a direct interest in every new permanent pigment which the chemist may discover. Henceforth the operations of the artist and the photographic printer are intimately associated. One may exercise genius in the production of works of high art, while the other performs a merely mechanical operation; but the object is the same, and the means employed are nearly identical. Each endeavours to produce "a thing of beauty," and whether that shall "become a joy for ever" entirely depends upon whether the pigment employed be permanent or fugitive. The same pigments are employed by each, with certain exceptions, and each employs a vehicle or medium to mould his pigment, and fix it upon the paper or canvas he employs. The painter in oil uses a siccative varnish, which oxidizes, dries, and becomes insoluble in the ordinary menstrua of oil. The photographer uses gelatine and a chrome salt, a mixture which becomes insoluble under the action of light.

Now it is as important to the photographer as to the artist, that the vehicle or medium employed be colourless, or so nearly, so as to have no appreciable influence upon the hue of the pigment employed. This condition is fulfilled in both cases. The varnish or megilp of the artist is usually of a slight yellow colour in mass, but having no sensible influence upon the colour. The same may be said of the medium of the pigment printer. After washing his prints in warm water, and passing them through a bath of alum, the medium, which consists of insoluble gelatine and oxide of chrome, is of a very pale green colour, which might degrade somewhat a delicate shade of rose madder, but has no more action upon the brownish purples of the photograph than so much tawed leather, a compound of gelatinous matter and alumina, which it closely resembles in nature and properties.

We particularly insist upon this point, because it has been alleged by an eminent authority that the medium in question is yellow, and that it has a destructive action upon all colours employed with it of organic origin. I will merely observe, to show the utter incorrectness of the statement in question, although this has been already fully pointed out by competent authority, that if the medium were yellow it would be impossible to obtain pigment prints of a brilliant blue colour, for blue and yellow form a green or greenish colour; and if it had the deteriorating action upon alizarine and other organic matter as asserted, it would be equally impossible to obtain permanent proofs of a brilliant crimson; yet a frame containing impressions in both these colours, from a negative of Mr. Bedford, the "Old Mill," printed by Mr. Swan in 1870, hung for years in the windows of the galleries of the Autotype Company, both in the Haymarket and in Rathbone Place, and must have been seen by all present, and prove conclusively not only that such prints are obtainable, but also that when obtained they are perfectly permanent.

Having shown the importance of permanent pigments to the photographer, we will now proceed to show how such a pigment may be procured from alizarine, for, unfortunately, none of the madder lakes we have shown you can be employed successfully for that purpose. The crimson, rose, and pink lakes, which have alumina for their base, when mixed with a small quantity of very black pigment on the palette of the painter, and diluted with this medium, yield most brilliant tints, quite equal to those yielded by cochineal and those which the photographer obtains from albumen and chloride of silver exposed to light and toned with a salt of gold; but when these pigments are mixed with the photographer's medium, insolubility ensues without exposure to light, and the pigment paper no longer performs its functions.

Such at least has been our experience and that of others. We have always hitherto explained this action by supposing that when the alumina was in sufficient proportion to the alizarine to constitute a permanent pigment, such pigment when mixed with gelatine and an acid chrome salt yielded a portion of its base to the acid of the salt, and precipitated the gelatine, as acid salts are well known to do.

The process by which Mr. Swan obtained permanent prints in alizarine having been found to yield uncertain results, unless the greatest care was taken, we succeeded in preparing an alizarine compound in 1872, which was free from this defect, which had no action upon the gelatine medium, and which gave beautiful and permanent colours, and which, although capable of yielding double transfer prints of the most beautiful tints, yet this compound appears to have been ignored or abandoned by the Company, for on the Technical Manager of the Company visiting me in Paris in 1876, he was unacquainted with it as a manufactured article. Hence it is not surprising that on the publication of the fifth edition of their Manual, the practice of the art had so far been altered that, in answer to many queries as to the want of permanency of pigment prints, its chief promoters had to admit that to obtain what was termed an "exaggerated" brilliancy, fugitive colours must be had recourse to. We would ask whether any brilliancy beyond that yielded by silver and gold upon albumen has been asked for or attained.

We are aware that this admission is now withdrawn, and a better practice instituted, but not without some exceptions, for special licences are still supplied with fugitive pigment papers at their own request. At any rate, so long as the new practice is maintained a trade secret, we hope that it will not be deemed superfluous for us to describe the mode of obtaining permanent pigments with alizarine, and to explain the conditions necessary for that object.

First let us say that alizarine, like a great many dyestuffs, is not permanent alone, but must be combined with a due proportion of base. It is not sufficient merely to precipitate the alizarine from its alkaline solution by so much alum as is necessary for the purpose, for alizarine is precipitated by acids, and alum is an acid salt. The lake so produced may be very intense and brilliant, it may be perfectly insoluble in water, but if it be insufficiently charged with base, it is not the true permanent lake, but that substance mixed with a quantity of the uncombined colour which will yield to the action of the light. Hence it is not surprising, therefore, to find that certain photographic prints made with alizarine have been found to be fugitive, or so fugitive as to destroy the beauty of the tint and the intensity of the shade of colour.

When, therefore, Dr. Monckhoven, in the paper to which I have referred, laid before you prints made by him with pigments which contained alizarine, no surprise should have been excited, because in the same paper he furnished you with an explanation of the cause of this fugacity.

He informed you that it had been denied that iron and alizarine would produce a red colour; but that this was so, provided that the iron was in small quantity. He stated, moreover, that he used, or had used, such a compound.

Now we have here a piece of cotton print, the design of which is produced by iron and alizarine—the acetate of iron having been first printed on the fabric in two degrees of concentration, and the oxide after due preparation saturated with alizarine in the dye bath. You will perceive, even by this yellow light, that we have two tints: one of violet and the other of black—that is, of violet so intense as to appear black. Judge, then, from these tints, which are those of the natural compound of iron and alizarine, one diluted and the other concentrated, how small a proportion of the iron base Dr. Monckhoven's compound must have contained, not to have converted the crimson tint of the pure alizarine into the violet of the pure pigment, and hence its incapacity to resist the action of light.

En passant we may observe, the cotton print before you furnishes us with another proof that, in making the statements he did, Dr. Monckhoven was in error. Knowing that the notorious permanence of the alizarine compounds on cotton and other fabrics could not be denied, he attributed that permanence to the degree of depth or penetration of the colour into the fabric, thus ignoring one of the axioms of the calico printer, viz., that the topical colour must be of infinite tenuity upon the surface of the fabric to obtain the maximum degree of brilliancy. He effects this in two ways: first, by the extreme shallowness of the intaglio design upon his engraved copper roller; and secondly, by thickening his solution of iron or alumina salt with starch, dextrine, or gum, so as to prevent the mordant penetrating the cloth.

You will see in the print before you to what extent this principle has been carried, the light parts of the design lying in an extremely thin plane on the surface, exactly like a pigment print.

We have shown the cause of instability in Dr. Monckhoven's hands; it is possible that the same cause may have operated in the prints made by him from the pigment paper of the Autotype Company, which were also found to be modified by light, and which must have been made with alizarine if, as they allege, all their pigment paper issued since 1876 has contained that colouring matter.

If, to render the alizarine compounds permanent a certain quantity of alumina is necessary, and if, when in that quantity, it renders the medium insoluble, how are we to apply this valuable colouring principle so as to render it a proper pigment for the use of the photographer?

We have solved the difficulty completely by using so much alumina only as suffices to develop and maintain the red colour, and then adding another base—a salt of lime or magnesia in sufficient quantity to render the alizarine not only completely insoluble, but also permanent.

Here are numerous specimens of the prints produced from such pigment paper, both in double and single transfer. We will only add that such prints have been tested for stability by Mr. Simpson and others, and stood that test without flinching.

Having given some years of our life to render this beautiful art practical, and its products permanent, we trust we may be pardoned when we say that we read with pain and regret the defence made on a late occasion, when the permanence of pigment prints was called in question. It appears to us that, so far from that being a successful defence, it was a mere plea of "guilty" with extenuating circumstances.

It is not thus that carbon or pigment printing should be defended. It needed no such defence when it left Mr. Swan's hands; it was then free from this stigma.

Henceforth, we undertake to demonstrate practically that by means of alizarine every tint needed by the photographer can be produced by the pigment printer with a brilliancy equal to any that can be obtained by cochineal, and with the known permanence of madder lake. Let any desired tint be sent to Mr. Sarony, and we pledge ourselves that such tint shall be reproduced in permanent colour.

There is one more point on the practice of pigment-printing to which we would allude.

After obtaining permanent prints with alizarine, it was found that they were affected by immersion in the alum solution, which, as I have already stated, is a solvent of alizarine. Hence, when the finished prints were allowed to remain some time in the alum bath, both a sensible amount of the red colour was dissolved out, and an appreciable effect upon the tint produced.

It is a curious fact that, while the true alums, the double sulphates of alumina and potash or ammonia possess this solvent action upon alizarine, the simple sulphate of alumina is quite inert, yet, apparently, equally efficacious in fixing the gelatine print, so that the latter salt may with great advantage be substituted for the former, wherever alizarine prints are produced. The only drawback we know of to the use of alizarine-pigment prints is thus effectually removed, as Mr. Sarony has proved by several months' experience.

The following report is from the *Journal* of the Society.

Mr. PEARSALL said there was one remark he wished to make in regard to Mr. Bolas's paper. Mr Bolas spoke as if the whole question turned upon the presence of the baryta salt, and, though chromate of lime was mentioned, not one word was said as to its probable influence. Some years ago, in the course of some experiments in connection with chromic acid, he had had this substance before him, and, though he did not pay much attention to the colours, which were neither beautiful nor interesting, yet he thought it was possible that the "greening" or changing of the tint might be due to the combination of the common salts of lime with chromic acid as well as to the salts of baryta.

The PRESIDENT asked whether Mr. Sawyer would say a few words on the subject of the paper.

Mr. SAWYER: We have had this evening a somewhat exhaustive paper upon the subject of alizarine, interesting to some extent, although not, I fear, practically interesting in a photographic point of view. I take it the addresses that are delivered here, as a rule, have been such as would lead to some possible modification or improvement in the practice of photography. Mr. Johnson has given us a history of alizarine, an account of its uses in dyeing, of certain modes of preparation; but he has at the same time taken the opportunity of reflecting somewhat severely upon the Company of which I am a member, and also upon the learned Doctor whose address the Society heard read some little time since. I must say, sir, I feel somewhat diffident in approaching this matter, because I feel it is difficult for me to make the few remarks I should like to make without drawing upon myself the imputation of speaking in a "shoppy" or personal sense.

The PRESIDENT: I will stop you, Mr. Sawyer, when you are approaching that ground.

Mr. SAWYER: I hope that no charge of that kind will be laid against me; but when, in the paper just read to us to-night, it is recommended that we should go for our pigments to a certain individual who will undertake to make them of any shade we may require, I venture to say—

The PRESIDENT: Is there such a recommendation in the paper?

Mr. SAWYER: Certainly; that portion relative to Mr. Sarony.

Mr. JOHNSON: I simply mentioned this as a proof of the facts I had stated.

The PRESIDENT: The paper says, "If such a tint be sent to Mr. Sarony, we pledge ourselves such tint shall be reproduced in permanent colours."

Mr. SAWYER: That is the part to which I refer. Sir, I shall not venture to suggest any proceeding of the kind with regard to ourselves. Well, Mr. Johnson has made something like a com plaint against us, that we have allowed the perfect process of Mr. Swan to become, in the hands of the Autotype Company, deteriorated. I understood Mr. Johnson to say that Mr. Swan left his process perfect, and that afterwards we—

Mr. Johnson: No, that is not so.

Mr. Sawyer: You say that there is now a stigma upon the permanency of carbon prints.

Mr. Johnson: I said that Mr. Swan produced no fugitive prints. No fugitive pictures were ever prepared by Mr. Swan—that is all I wish to place upon record. My point, if I am not out of order—

The President: I think you are a little out of order. I must ask Mr. Sawyer to go on, if you please.

Mr. Sawyer: What Mr. Johnson said bore this reference to my mind, that Mr. Swan left this pigment process perfect, and that by our Manual of 1876 we confessed to the use, in certain cases, of what has been styled fugitive pigments. I will not discuss what are fugitive pigments. It may be, that because you have a small modicum of cochineal, that a print may be called fugitive, but not in any case such as to be absolutely discernible. As I have before said, what is there on earth that is not fugitive? The water colours which are now hanging on those walls in ten years' time will be changed and faded in their tints. I do not say that this change is a change for the worse, as they will have but got mellowed by time, and have got the impress which time alone can give. I do not, of course, compare photography to water-colours, but I wish to point out that a great deal has been made, for certain purposes, of this term "fugitive," when in no sense has the term been applicable to carbon prints. But I will let that pass. We said in the Manual of 1876, that in order to obtain brilliant tones, it had been necessary to employ certain colours which where not absolutely permanent. Mr. Johnson wishes you to infer that during the time he was with the Autotype Company he used a solution or a preparation of alizarine, which was perfectly suitable for double transfer prints.

Mr. Johnson: I said in 1872.

Mr. Sawyer: And the gist of his remarks is that from 1872 to 1876 we had ignored this valuable discovery—had put it on one side—and, for certain purposes, had taken and used fugitive colour.

The President remarked that rather dangerous ground was being approached.

Mr. Sawyer: I will endeavour to avoid it. It is said that this preparation of alizarine was not suitable for single transfers, because it stained the transfer paper. As most of the work done by the Company, both in Mr. Johnson's time and since, is single transfer, it is absolutely necessary that the colour employed should not stain the single transfer paper. But the allegation is, that colour was prepared as to be so suitable. There are two double transfer processes—that of Mr. Johnson and that of Mr. Lambert. Mr. Johnson's did not find favour, because it did not give that brilliancy of surface desired by photographers, and the transfer was replaced by development upon wet collodion. But up to 1876 it was not possible to develop prints, containing this preparation of alizarine in combination, upon collodion, because it stained the latter to such an extent it was absolutely useless. As photographers must have this brilliancy, it was to meet this difficulty that we introduced a small quantity of what has been called fugitive colour; whether it is fugitive or not the results must show. All that I can say is, that we have had pictures hanging for a lengthened period in our rooms, exposed to a strong light. There are pictures in every part of England; the Society have had a number in this room, and none have ever shown signs of fading.

Mr. Sawyer then referred to the history of the discovery of the new forms of suitable alizarine colouring matter for introduction into the carbon tissue, and continued: Our efforts, as members of the Company, have always been most earnestly in the direction of permanency. Thousands of experiments have been made, we have got together the best chemical assistance we could procure, and when a paper is read before you containing the matter which the latter part of this one contains, I felt, that at the risk of being a little out of order, I had a right to defend the course of action which has been rather severely commented upon by the author Mr. Johnson, in the process which he has patented, makes a point of using a salt of lime in conjunction with alizarine; but in my practice (carried out with very great care) this salt has not had the slightest effect one way or the other, excpt to increase the bulk of the alizarine. We keep our preparation of alizarine a secret, and we honestly say that we do not come here to reveal what is a source of commercial profit, and by which we live. Mr. Johnson says that in his experience alizarine prints are effected by immersion in the alum solution. My experience does not bear this out. We have used alizarine for single transfer without any stain, and we have found it to mix perfectly. I am sorry to come before the Society in this light, and I think it would have been better if Mr. Johnson had confined himself to the history of his own invention, and to have left Dr. Monckhoven and the Autotype Company to that oblivion which would have suited them.

Mr. S. Fry thought that any fears that might be entertained as to the permanency of carbon prints were quite unfounded. He (Mr. Fry) could not help thinking, however, that Dr. Monckhoven's paper was very injudicious; at the same time, he did not believe he intended to fix anything like a stigma on the carbon process as it is worked in the tissue supplied to the whole world. The statements he made were not such as could be fully borne out by facts.

Mr. Bird: I am sorry a discussion upon carbon printing has taken a form which is scarcely suitable for a learned society. Mr. Johnson's paper is a clever and interesting one; but certainly he has indulged in reflections of a more or less personal character. I may, perhaps, be allowed to correct Mr. Johnson in a matter of history. He says that in 1872 he succeeded in producing alizarine suitable for use in pigment prints, which, with double transfer, answered perfectly. I think that here Mr. Johnson must be slightly in error. Mr. Spencer was associated with Mr. Johnson in these experiments, and Mr. Spencer—an able and careful chemist—did not know that—never said to me that he had a method by which alizarine could be used. The staining of the tissue was a difficulty not then overcome. Mr. Johnson was associated with us at that time as one of the Company, and he makes therefore, in his mind a little error as to dates. We had tried alizarine without effect, and it is only under new combinations that if has become at all practicable. Dr. Monckhoven suspected its permanency, and, as it is a matter of great importance that, carbon prints should be without the slightest suspicion of change any communication which could assist that result should be thoroughly welcome. At the same time, I must say, with regard to Dr. Monckhoven's statements, that we deny that his experiments were made with the Autotype Company's tissue. Here are specimens said to be on this tissue, which I am absolutely certain were never made on our tissue at all. We deny the fact, and it is unfair to publish experiments which are of a one-sided character. I believe Dr. Monckhoven to be under a mistake with regard to his paper, and to be very rash in regard to his facts.

The President observed that, without entering into the merits of the controversy, he might point out that when Mr. Johnson said that in 1870 the Autotype Company produced prints which did not fade, and that now a certain stigma rested upon their work, a disagreeable inference could not fail to be drawn. He was sorry the statement had been read, but, having been read, he was obliged, as a matter of justice, to allow Mr. Sawyer an opportunity to reply. It was well known what the Autotype Company had done. Not very long since, a large number of prints were exhibited by the Society which had been produced some six or seven or fewer years since, and, to his mind, there were no signs of fading. Dr. Monckhoven stated that he had made experiments with the Company's tissue, but this had been denied by Mr. Bird. It was painful to him (the President) that a difference of this kind had arisen, but he trusted that it would be the last time, and that all would endeavour to work for one common object—the improvement and development of photography.

Mr. Johnson in, reply, said: As regards the importance of the subject, I need simply refer you to Mr. Sawyer's remarks. He tells you he has made thousands of experiments upon colouring matters to arrive at a permanent compound. At the same time, having myself, I believe, succeeded in forming such a compound, I think it is my duty to call your attention to the result. It is true that the matter has been put on record as a patent, but that patent will be manufactured and supplied at a reasonable price to the public, and, as every one can now make the tissue for himself, the question of permanent colour comes home to every individual present. As to the question raised by Mr. Sawyer in respect to the double transfer, it is a matter which can be very easily tried. I pledge myself to show him—if Mr. Sawyer will allow me to state what it is. May I say what is the formula?

Mr. Sawyer: Mr. Johnson is perfectly at liberty to state what the formula is, for up to this time it has not come down to the Company.

Mr. Johnson: On the contrary. You have the solution.

Mr. Sawyer: It is simply called the red solution, and nothing more.

Mr. Johnson, in reply, was understood to say that by using tartrate of potash the ordinary effect of the insolubility of gelatine of alumina was no longer obtained. With madder red in combination with alumina for a basis he pledged himself to produce perfectly permanent pigments, only he admitted that they could not be used with single transfer. It also stained collodion, but in certain methods this might be obviated. In conclusion, Mr. Johnson said he considered he was justified in claiming that he had settled the formula for double transfer in 1872, and that having seen in the 5th edition of the "Autotype Company's Manual" a statement that fugitive materials were employed, he thought it was his duty to place on record his share in the matter.

The PRESIDENT, in closing this discussion, alluded to a promise made by Mr. Sawyer, that a print, one half of which was to be covered, should be exposed for some time to light; and hoped that the promise would be fulfilled.

THE ALLEGED FADING OF CARBON PRINTS.

BY THOMAS BOLAS, F.C.S.[*]

THOSE practising the so-called carbon process have been, from time to time, reminded that the use of fugitive pigments will lead to the production of fading prints; and, at the present time, this fact is sufficiently recognised by all concerned.

Dr. Monckhoven now strikes at the foundation of the process, and his remarks would lead us to believe that carbon prints, as at present made, are essentially alterable by the action of light, and he appears to found his case principally on two bases, viz. :—

1st. "Many photographers have already noticed the alteration which takes place when carbon prints have been exposed for a few weeks to the influence of the solar rays. These prints lose their beautiful colour, and become yellowish or of a dingy green."

2nd. "A sheet of paper is immersed in bichromate of potash and dried, it is then exposed for an hour to daylight; next washed for an entire hour in boiling water, to be afterwards immersed in an alum solution for several hours; afterwards washed in cold water, and finally hung up to dry.

"According to the before-mentioned theory (that usually received), this paper should contain nothing more than a salt of sesqui-oxide of chromium, absolutely unalterable by the action of light. But the paper is yellow, while salts of sesqui-oxide of chromium are green. But, moreover, if this paper be exposed to light, a part being covered by a mask of black paper, it undergoes alteration in the course of a few weeks, and a sharp, distinct impression of the mask is brought to view. Now, where the light has acted, the paper is green, like all the salts of chromium."

Dr. Monckhoven next sums up his conclusions as follows:

"This experiment and many others which we have made in this direction, prove, to our thinking, that neither hot water nor alum fixes carbon prints. It is true that the excess of bichromate is removed by these means, but the chromate salt, which has rendered the gelatine insoluble, not only remains, but this salt itself *undergoes a change by exposure to daylight.*"

With regard to the first statement, the general feeling in this country was surprise, as I think very few have noticed the phenomenon alluded to by Dr. Monckhoven, and then only in cases where fugitive pigments have been employed. I can say quite confidently, that a print made with permanent colours, and treated in the usual way, does not undergo the change described by the Doctor, as I have frequently had occasion to compare the colours of prints, not only when new, but also after partial masking and exposure to light. This holds good, whether the prints have been treated with alum solution or not.

With regard to Dr. Monckhoven's experiment on simply bichromated paper, I can merely say that I have repeated it several times, and find that no yellow colour remains after washing, the washed paper being no longer sensitive to light; and the same holds good in the case of simply gelatinized paper. In order to ensure the absence of mineral impurities, which might vitiate the result, I prepared paper myself, using in some cases cotton, and in other cases linen fibre.

The Editor of the "PHOTOGRAPHIC NEWS," in a leader under date April 5th, points out a possible and, I am inclined to think, a probable clue to the change of tint noticed by Dr. Monckhoven. In this article the writer assumes that the Doctor used a single transfer paper containing barium sulphate, and under these circumstances barium chromate[*] would be formed, giving a light yellow tint to the groundwork under the print, and when this is exposed to light it will naturally change colour, and this despite of long washing or treatment with alum.

I prepared samples of single transfer paper with various proportions of barium sulphate, and found the sensitive yellow tint to be proportionate to the amount of barium sulphate present, and to the time the bichromated tissue is allowed to remain on the transfer paper before development. A few hours' exposure to sunlight is sufficient to change this yellow colour to a very light green.

I believe that single transfer paper containing barium sulphate has never been manufactured in this country, the English single transfer paper being merely coated with a thin layer of gelatine made insoluble, and any yellow tint this may take, from the diffusion into it of potassium bichromate, can easily be removed by soaking in cold water.

The thanks of British carbon printers are due to Dr. Monckhoven for having raised a discussion which has opened their eyes to the danger of using single transfer paper from unknown sources, it being obvious that the sending out of expensive enlargements so sensitive to light as to show a change after a few hours' exposure would tend to bring the carbon process into disrepute. Thanks are also due to Mr. Wharton Simpson for having indicated the nature of the danger.

As soon as I have time to make the necessary series of experimental tissues, I hope to present to the Society some remarks on that part of Dr. Monckhoven's paper in which he discusses the pigment question in relation to the gelatino-pigment process.

ADDENDUM.

Since the above communication was sent to the Photographic Society, Dr. Monckhoven has published further particulars which necessitate a few remarks.

As a transfer paper, containing barium sulphate, was not used in Dr. Monckhoven's experiments, it is clear that the yellow colour observed by him does not arise from the presence of this salt in the paper, and the fact that he regards the formation of barium chromate, by the action of potassium dichromate on gelatine containing barium sulphate, as "*contrary to the most elementary ideas of chemistry,*" indicate that he is not deeply impressed with the dangers attending the use of certain pigments for giving opacity to single transfer paper.

The term "fading," as used in Dr. Monckhoven's original paper is, according to his last communication, to be read as "change," but he practically retains his old position by stating that "simple washing of a carbon print, even though it be prolonged for hours, will not eliminate the chromate, nor fix the image." This is just the point which is contrary to the experience of others.

In Dr. Monckhoven's last communication he recommends the use of alum, which he repudiated two months ago, and, instead of dipping his prints in a solution of sodium bisulphite, he now adds an insignificantly small quantity of this salt to the alum bath.

Since Dr. Monckhoven's original paper was published, several notices have appeared, showing that workers in this country find a moderately long immersion in water, or in water followed by alum solution, to be quite sufficient to fix carbon prints, provided that obvious sources of mischief are avoided.

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[*] Read before the Photographic Society of Great Britain.

[*] Chemists are familiar with many cases in which physical condition and mass determine a reaction, or the reversal of a previous reaction. As an example may be mentioned the well-known lecture experiment, in which water and metallic iron are obtained by passing hydrogen over heated oxide of iron, and the inverse phase, in which oxide of iron and hydrogen are obtained by passing water vapour over heated metallic iron.

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RAPID EXPOSURES.

Our article last week, describing M. Klary's demonstration of Boissonas' process, has elicited many communications from correspondents, showing how keen is the interest of photographers in anything promising to shorten exposures in portraiture. Rapidity of exposure has indeed been one of the chief desiderata of the photographer from the first days of the art. Mr. Andrew Ross, who may to some extent be regarded as the father of photographic optics, was appealed to once for a lens of greater rapidity than the ordinary portrait lens, which he had brought to a high state of perfection. He answered that opticians had done their utmost; and photographers must now look to the chemist to provide them with more sensitive preparations in order to secure greater rapidity in operating. Since then optical appliances have materially aided rapidity, but still the portraitist, who duly appreciates the value of expression, asks for shorter exposures. Some of our correspondents write angrily indulging in the usual denunciations of secret processes, and are derisive that we should become the mouth-piece of process mongers. We are not seriously concerned to discuss the question of secret processes at present. If A possess something valuable to B, and by which B can make money, there is no obvious evil in his purchasing from A that something, whether it be a process or a camera. We have met with a startling novelty of vital interest to photographers, and we, as in duty bound, describe it to photographers. If incidentally the vendor of the process is served, so much the better for him. But our concern is with the interests of photographers generally. If the matter is of vital concern to any of them - as, we think, it will be—we have pointed out the way in which they can satisfy themselves, and we take it for granted that none will buy the process without first seeing a demonstration. For five pounds sterling, or little more, any photographer may secure a brief visit to Paris, and witness the demonstrations in the Rue Vivienne. But to those who, from various causes, have no intention of purchasing the secret process, the knowledge that it is possible to work the wet collodion process so as to secure such a degree of sensitiveness as we have described is of vital importance. A knowledge of the possibility of success stimulates experiment and research.

It is our intention another week to give a brief glance at the various methods which have been suggested and tried for securing a high degree of rapidity in working the wet processes, and estimating the degree of success which has been attained, and the causes of failure.

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THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

In announcing the conditions of the forthcoming exhibition of photographs and competition for honours, the Council of the Photographic Society has modified the arrangements which have obtained in former years, and, we think everybody will admit, with reason. Everybody used to be invited to contribute and compete, whether members of the Society or not; thus non-members possessed all privileges to which members, subscribing a guinea each year, were admitted. This has often been the subject of comment, and sometimes of a little uncomfortable feeling. There are inevitably heavy expenses to be undertaken in organizing and holding an exhibition of pictures of any kind in a good room easily accessible to the public. These expenses the members must bear, whilst non-members, with equal opportunities for display and for competing for medals, do not contribute one penny to expenses. This time, non-members will pay a nominal sum of one shilling per superficial foot for the space they require, entering into the competition for prizes without paying any fee whatever.

Another important point is definitely settled this time, and in favour of exhibitors and the public. It is decided that labels containing the name of the artist and the title of the picture may be affixed in front. To secure, as far as possible, neatness and uniformity, the Council has resolved to prepare a suitable form for receiving any necessary inscription, which can be had of the publisher. Fuller information regarding the contributions will be inserted in the catalogue; and we may here suggest that the fullest particulars will add materially to the interest of any contribution. The number of specific medals offered is less than last year, but a comparatively unlimited number appear to be placed at the disposal of the jury for rewarding any form of excellence which they may think worthy of such distinction. The constitution of the jury will be similar to that of last year. It will consist of two distinguished painters, who have already signified their willingness to assist two members of council, two non-official members of the Society, and the President.

We earnestly hope that all photographers will contribute high-class work, and so secure a good exhibition. We subjoin details of the arrangements as given in the official programme:—

Exhibition of Photographs.

An exhibition of photographs will be held at the Gallery of the Society of Painters in Water Colours, 5a, Pall Mall East, London, S.W.

It will be inaugurated by a *conversazione*, open to members and their friends, at eight p.m. on Tuesday evening, the 8th of October (morning dress), and will remain open until the 12th of November.

Pictures must be forwarded to a place (hereafter to be mentioned in a circular) not later than Saturday, September 28th.

Each frame may have the exhibitor's name and the subject written on a label; but no address, or anything in the character of an advertisement, will be permitted.

The labels to be used may be obtained of Harrison and Sons, 45, St. Martin's Lane, London, W.C., at one shilling a dozen, post free.

Description of processes, and further details, will be inserted in catalogue, subject to the approval of the Committee.

No picture in Oxford frame will be admitted.

No picture previously exhibited in London will be admitted.

No photograph coloured by hand will be admitted.

Not more than one frame of cartes-de-visite or cabinet pictures can be received from one exhibitor.

A committee of selection will have the power of rejecting any pictures forwarded.

Bronze medals will be awarded as follows:—Two medals for the pictures, or series of pictures, which, in the opinion of the judges, shall display the greatest amount of excellence. One ditto for the best landscape, or series of landscapes. One ditto for the best portrait, or series of portraits. One ditto for the best single figure study. One ditto for the best *genre* picture, or series of pictures. Two ditto for the best photo-mechanical prints. One ditto for the best transparencies. One ditto for the best micro-photograph, or series of micro-photographs. One ditto for apparatus.

Medals will be placed at the disposal of the jury for any novelty or other form of excellence in process or result.

The award will be decided by a jury of seven gentlemen, consisting of the President of the Society, two members of council, two other members of the Society, and two artists (painters) of reputation.

No award will be made when the works in competition are not, in the opinion of the jury, of sufficient merit.

The competition will be open to all photographers; but to non-members a charge of one shilling per square foot will be made for wall space, the minimum charge being five shillings. Foreign photographers will, for the occasion, be considered honorary members.

The charge for wall space to those exhibitors who may become members of the Society at the November meeting will be remitted.

L. Darwin, Lieut. R.E., Hon. Sec.

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NOTES (PHOTOGRAPHIC AND OTHERWISE) FROM SWITZERLAND.—II.

[By our Special Correspondent.]

Switzerland is hardly the place to pick up photographic memoranda of value, and I fear I shall have but little of practical value to communicate in a second letter from the little republic. I may be wrong, but I do not think Switzerland possesses a journal devoted to photographic literature, nor do I believe there is any society of photographers within the domains of Helvetia. Nevertheless, Switzerland has been the home of many clever disciples of the camera. M. Constant-Delessert, who died a few years ago at Lausanne, was an experienced amateur, and made many important additions to our knowledge of dry plate photography. M. de Courten, who resides at Sion, is another eminent amateur; while the great Dornach establishment of the Braun family is only just over the border in Alsace. After flourishing for many years, we hear that the establishment is as successfully carried on as ever, although a journal which was started by the firm but a few months since never attained to a second number. No Swiss photographer, however, seems to have been able to wrest from MM. Leon and Levy, the Paris firm, the production of those charming stereo transparencies of Switzerland that are so familiar, and, despite the high price of these, their production is still a monopoly, unless Mr. England has lately secured some of the trade.

Switzerland just now is suffering from a plethora of hotels. The great impetus given of late to travelling, which owes its existence more especially to the exertions of energetic excursion agents, has caused the Swiss bankers of Zurich and Berne to invest money in the building of monster palaces throughout the country. A waterfall or steam boat pier at once incites the construction of a group of hotels, and in some spots like Lucerne, Thun, Interlaken, &c., the number of inns has quadrupled during the last ten years. Another mistake which has been committed is that the hotels are too vast and pretentious. Instead of inviting an ordinary traveller to enter, they rather deter him from doing so. Imagine Mr. Jones or Mr. Smith, who have a tolerable income at home, and live with their family in some respectable suburb of London—shall I say Highbury, Highgate, or Blackheath, or Bayswater?—and who, notwithstanding their being comfortably off, have yet to look after their income to prevent it going too rapidly; imagine good people of this sort asked to enter a polished dwelling, to occupy luxurious sitting rooms and lofty, elaborately furnished bedrooms. It is very nice, no doubt, all the splendour, but neither Mr. Jones nor Mr. Smith particularly cares about it, and when it comes to paying exorbitant charges into the bargain, they decidedly object. They do not ask for all this fuss and show, and do not want to pay for it. Yet the Swiss imagine, evidently, that anybody who is rich enough to travel is rich enough to afford all these things. All Jones wants is a comfortable hotel and good eating and drinking, and he has no objection to pay his way at any time. But he objects to pay for things he don't want. Now if he once gets into one of these big hotels, the chances are that he must go the round, for one hotel keeper sends him to another, and even telegraphs his departure by train or boat, if the traveller does not actually travel in one of the hotel carriages. The competition is so keen that there are, espicially at this time of the year, a row of a dozen hotel omnibuses waiting for half as many passengers, and these seemingly avoid the vehicles of the larger houses. One monster hotel in Thun, I hear, is in a very bad way, and another palace was shut up last year for some reason, the beautiful furniture and decorations suffering accordingly. Several of the houses have been thrown back upon the hands of the mortgagees—the bankers aforesaid—and these, in some cases, have been compelled to turn hotel keepers to save themselves from ruin.

It is a case of killing the goose with the golden eggs. A tourist comes to Switzerland for the summer, and at the end of his holiday goes back, having, no doubt, enjoyed his holiday, but smarting over the cost. He may aver over and over again that the trip was well worth the money, but, somehow or other, he is not anxious to repeat the experiment. So that the hotelkeepers do not gain in the end.

Fortunately for myself, I am acquainted with some good second-class houses frequented by the Germans and the Swiss themselves, and have been able to enjoy a few days at Lucerne, Thun, and Geneva, without having to pay heavy bills. But the manner in which travellers are beset by the big hotels will be seen from an incident I will relate. I had visited the Giessbach Waterfall, and engaged a boatman to row me across the Lake of Brienz. "What was I going to do?" my boatman enquired. "Walk to Meyringen," I replied. But the boatman could advise me better, and his advice was to take a little carriage from the hotel, where he would land me, and have a bit of dinner meanwhile. It was not worth my while to argue, and presently we came to the landing steps. As usual, the whole *personnel* of the hotel were ready to receive us, and, as it was raining a little, each one carried an umbrella. It was not a question whether we should enter the hotel or not; that we should do so was a foregone conclusion. They had a prescriptive right to us, they thought, quite as much as if we had been paid for and delivered. However, I thought otherwise, and as soon as my lady companion and myself had been "unbrella'd" up to the road, we turned gracefully to our left along the highway, and set out for Meyringen.

Going up the Rigi Mountain on railway is an experience to have undergone, and so is coming down again, for the slope down the mountain, which is something over 5,000 feet, looks like an angle of 45°, and there would be a swift run down into the Lake of Lucerne if an accident did happen. It is true they do something to minimise the risk; only one carriage is permitted to ascend or descend at one time with the engine, so that, after all, the number of people lost by a mishap would not be so very great. At the same time, even if the per centage is small, one rather objects to represent it. It was a fine day, but a blue mist over the mountains towards the Bernese Oberland veiled the landscape in that direction, and I was much surprised, in looking through a disk of yellow glass, to find this haziness disappear considerably. A rough little observatory on the top is provided with telescopes and tinted glasses of all shades. These I tried one after another, only to find that white light was the best after all, except in the case of yellow, as I have said. It was morning, about eleven, at the time, and the yellow rays certainly cleared the horizon, and permitted us to view the outline of the mountains more distinctly. I fear, however, my photographic friends would hardly like to employ such a screen in front of their cameras to sharpen the landscape. Certainly it would not have the effect of permitting them to take instantaneous views. However, we must always bear in mind, in comparing the eye to the sensitive collodion plate, that the film upon the latter represents inert matter, while our retina is a living organism.

Some pretty brooches and solitaires struck me at Lucerne. At first I thought they were enamels, so bright and delicate were the pictures upon them; but their price and a closer inspection led me to the belief that they must have been carbon prints upon a glazed surface. The pictures were photographs of mountains and monuments in Switzerland, the Mount Pilate, the Lion of Lucerne, &c., and they were so delicately and highly finished that to all appearance they were upon pebble or porcelain.

Swiss costumes give plenty of work to photographers hereabouts, for there is scarcely a visitor who does not return home with a few cartes or cabinets showing the pretty guises of the peasantry in various parts of Switzerland. One rarely sees an old or ugly face among the models, and the girls are generally posed with some taste and elegance. The reason of this I can tell you, for it was communicated to me by one who had photographed a large series of these costumes. He did not go into all the out-of-the-way valleys and nooks to discover his sitters, but simply availed himself of such good and agreeable models as he could find in the vicinity. Half a dozen young ladies were sufficient for his purpose to give variety. He then had the costumes made to fit his models, and photographed those who were well accustomed to the operation. The milk-maids and shepherdesses that are depicted in the shop-windows are as strange to the clothes they wear as the purchaser of their photographs, and in some cases know less about life among the mountains. But as the costumes are *bona fide*, and as it is only for the costume that the purchaser buys the picture, there can be little to grumble at. Some of the costume pictures are very elaborate; they measure twelve or eighteen inches in height, and, coloured, sell for twenty francs a piece. They are charmingly got up and painted, and if one could only rely upon the permanency of the print, they would be cheap pictures enough. It is in the taking of photographs of large dimensions like these that the professional model becomes exceedingly useful.

Switzerland is becoming so cockneyfied, and Lucerne grows so much like Margate, that one hardly expects to see many wild beasts in the neighbourhood. On the day that I crossed the little Brünig Pass, however, I had the fortune to stumble across a fox, an eagle, a viper, and a scorpion. The last named rarity I killed on some hot pebbles on the shore of the Lake of Lucerne.

FRENCH CORRESPONDENCE.

Mr. Wharton Simpson at Paris—Photographic Society of France—Janssen's Solar Photographs—Photographs on Stuffs—Hints on the Use of Carbon Tissues—Jury of the Photographic Section at the Paris Exhibition—P.S. to Correspondents.

Visit of the Editor of the "Photographic News" to Paris.—The readers of the Photographic News will have already learned, through the leading article at page 282 of the last number of that journal, that we have been gratified here by a visit from Mr. Wharton Simpson, with whom we have had the great pleasure of making several excursions in search of photographic novelties. It is not our part to render an account of the observations we have together been able to make in the course of our common investigations, but we may be allowed to express the lively satisfaction which we have felt in hearing so experienced a critic give expression to opinions which are absolutely the same as our own. I am not aware whether Mr. Wharton Simpson intends to proceed further with the able report on the experiments exhibited to us by M. Klary at the studio of M. Franck; but my own duty as Correspondent of the Photographic News is to give some account of the meeting of the Photographic Society of France, at which we were both present.

Meeting of the Societe Francaise de Photographie.—In a few words, then, we may say that the principal interest of the evening was centred in the examination of portraits obtained by the Boisonnas process (among them were the very ones which had been produced before our own eyes), and submitted to the members for inspection. A few communications were also made to the Society, more especially a note of M. Michaud, giving in part the instructions for his process of photo-electric engraving, which I have already described in my last letter. Two new instruments were shown by M. Marion—Cadett's pneumatic shutter, and the three-roller press, by which positive paper prints can be burnished either with the use of heat or without. Both of these ingenious and effective pieces of apparatus will have an assured success here, judging by the manner in which they were received the other evening.

Janssen's Solar Photographs.—We have already several times brought to the notice of our readers the pictures of the sun which M. Janssen produces from day to day at the Meudon Observatory. As regards the enlargements of these proofs, which are of such high scientific interest, this eminent astronomer has realized perfectly exceptional results. He submitted to the notice of the meeting of which we are speaking, specimens measuring forty-six centimetres in one dimension, and representing only a fractional part of the sun's surface. It must not be forgotten that to comply with the requirements of the scientific purpose for which they are intended, these enlarged prints must possess all the purity and accuracy of the original negative.

Photographs on Stuffs.—Messrs. Allard and Guyot, silk manufacturers of Lyons, are introducing a new industry: the production of photographic impressions on stuffs. They sent to the meeting of the Photographic Society several pieces of silk, with a variety of photographic pictures printed on them—among others, some large medallions representing pictures of the old masters. These specimens are no less than forty metres in length. The process by which they are produced is not given, but there is reason for believing that the prints are made with salts of silver. But, however that may be, this application of photography, which ever since the discovery of the art has been sought after, and made the object of numerous more or less successful experiments, appears now to have been successfully realized in the hands of Messrs. Allard and Guyot.

Hints on the Use of Carbon Tissue.—M. Lamy, whose carbon tissue is so highly thought of, has published a short but very practical treatise on the method of working with his tissues. We find more especially a series of instructions applicable in general to the new method of taking impressions; for the causes and remedies of some of the failures to which the operator is liable in this kind of printing are carefully set out. It may perhaps be of service to reproduce here some of these notes. It happens sometimes that the bichromatised carbon tissue when applied to the negative adheres to it so closely that it cannot be detached without spoiling it. To prevent this the tissue must be used only when quite dry and stiff, both in the middle and at the edges. On the other hand, emulsified paper which has been softened for the purpose of transfer will occasionally double itself quite back, and refuse to adhere to the substratum on the glass, because it has, in fact, absorbed too much water. In a case of this kind the paper must be hung up in the dark until it is dry, or nearly dry, and then it must be softened again until it resumes its plane surface; in this condition it can be easily transferred to the glass. Should it, however, happen that, notwithstanding this treatment, the carbon tissue still declines to adhere to the glass, it must be either that it has been considerably over-exposed, or that it has been dried before the fire or in a workroom heated by a stove, or else that it has been exposed to the action of destructive exhalations. When the picture creases and tears while being developed, it is owing to the glass having been used before the substratum was perfectly dry. If bubbles are formed during the same operation, it is on account of the paper not adhering perfectly to the glass; and this is due to the latter not having been properly softened, or to the fact that the squeegee has been either forgotten or improperly used. When, in developing after the separation of the paper, the image is allowed to form on the support with its face upwards, spots will often be found as if stippled. To avoid this accident, it is necessary, as soon as the paper is detached, to turn the picture with its face downwards. Drying the picture before the fire or in the sun after it has been permanently transferred must be carefully avoided. Contact of the fingers with the reverse side of the paper is always injurious at every stage of the process; it leaves round or oval spots of a darker colour than the picture; it is therefore advisable to take the nicest precautions in order to prevent this from occurring.

Jury for Photography at the International Exhibition.—We are still ignorant of the names of the members who will represent England on the International jury. The members of the jury for France are M. Davanne, le Comte d' Heliaud, and M. Ad. Martin, with M. Franck de Villecholle as supplementary juror. These four gentlemen were also members of the allotment committee. The labours of the jury are to commence this week, and to be proceeded with continuously, so that the awards may all be made by the end of this month. ERNEST LACAN.

P.S. To Correspondents.—I may be permitted to subjoin a few words in answer to those subscribers of the PHOTOGRAPHIC NEWS who have done me the honour of writing to me within the last few days. I have had the pleasure of complying with the request of Mr. Wheeler and Mr. Samuel Fry; "All is right now in their exhibition." I have seen in their place in the English gallery the fine prints of Mr. Boucher, of Brighton, whom I beg to thank for his letter. The short treatise which he has published under the title of "Hints to Sitters"* contains in a concise form some excellent suggestions, and reveals an experienced artist anxious to do his best for his patrons.

GROUPING.

BY W. HEIGHWAY.

THE horror some photographers express on being called upon to pose a portrait group is only to be exceeded by that felt in most cases at the result.

We photographers are responsible for some wild, weird things in the way of composition, especially where we have to handle more than one figure.

It may be urged that criticism should be disarmed where admission of imcompetence is made. I don't know so much about that; because any one placing himself in a post of responsibility should be competent to meet all the requirements of the situation. However, I have no desire to be critical. If you know where you fail, your mind is in good condition to receive instruction,—and I trust these hints may be of service to you.

The first principle of a group is that there be motive, object; that the figures forming the group bear some relation to each other; and that they conform to the laws of Art.

You may have a very well-expressed story in your picture, and miserably faulty composition; and, on the other hand, your picture may be technically correct, yet most unmeaning.

I hardly know which of these two faults predominates in general—I rather think *both!*

It is very grievous to see two or three people in a group seem to express by their attitude, if not positive aversion, at least an insulting unconcern, of each other's presence in that picture. Especially is this lamentable where the figures taken singly would be admirable.

I believe that in a group it were better almost *to sacrifice something of individual likeness to general effect*, should it be necessary—but I don't believe much in the necessity.

(I am conscious of the boldness of even this reserved opinion, and await with fear and trembling the contemptuous criticism it may call down on my devoted head.)

There should in all cases be apparent—or, better, suggested—some interest which has called the persons forming the group together, some incident in which they are mutually interested. The promiscuousness characteristic of most photographic portrait groups is especially to be avoided. Not only is it very dull and stupid in result, but thoroughly unreal. People never stare hard in contrary directions, unless they want to "cut" each other; and surely this cannot be the motive of the majority of photographic groups. This method I have observed obtains so generally, as almost to have degenerated into a habit.

A YOUNG MOTHER AND CHILD.—Here surely is good material for a picture full of human interest, the treatment of which would not appear very difficult. But how does the average photographer go to work? He places the child near the mother, certainly, because they can't be very far apart to come in the same picture, but he directs their eyes as far a under as possible—one looking out of the right side of the picture, the other gazing blankly out of the left side. So natural! And then we wonder that groups are so uncomfortable and unsatisfactory.

The truth is that we throw away very many of our happiest opportunities. Posing properly such a group as that we have supposed, would not only prove satisfactory in the resulting picture, but easier, because natural treatment would direct the mother's attention to the child; this would hold the interest of the young sitter, and save much of trouble and the danger of restlessness in both.

But we must be so dreadfully ingenious, that truth is too tame and poor.

Conventionalism is the ruin of many pictures. As you should strike a mean between the features in a single head to produce a good likeness, so in a group must you pay the same regard to the requirements of the picture, even should the individual likenesses have to suffer. But, as I said before, these ought not to be, of necessity, sacrificed much—if you have proper artistic instincts.

Let the figures of your group be massed, not scattered over the picture—

Place each figure in the best position, to bring out points of likeness—

Secure proper variety—

But do not sacrifice unity; and, above all, let there be apparent an intention and meaning in your work.

It is by no means necessary for two persons to stare hard at each other. In actual conversation, for instance, this is seldom to be seen, even where the talk is earnest and important; and in the suggestion of this in a picture a great deal of licence may be taken without in any degree endangering the result—but an attitude of attention must be apparent.

Fond as anyone might be of talking, I doubt very much his powers of long maintaining conversation if the head of his audience were entirely averted—it would be too discouraging.

Variety should be shown not only in the pose of the heads, but in their relative position in the picture. Two or three figures of the same height in line would not make a very interesting picture—unless you secure variety in the lines of the figures in the direction given to the body, the arrangement of the arms and hands, the drapery, and the disposition of the accessories.

Where a group of persons is taken in the small size of the carte-de-visite it is certainly better to concentrate all the attention on the pictorial interest, for at best the portraits cannot be very valuable; but with this treatment, letting each sitter take his chance of getting a good likeness, the carte-de-visite size is better adapted to groups than to single full-length figures. There is a solitary, forsaken appearance about the single figure in the card picture that is very pitiable, unless very skilful attention has been given to background and accessories.

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* Reference is probably made to the tractate supplied by our Publishers to photographers for issue to their sitters.

Of the sizes of photographic pictures a great deal might be said in dispraise, especially of the carte-de-visite, unless it is kept to its use for head and bust-portraits, for which it is well suited. In this, however, the picture has been adapted to the size—not the size to the picture.

There is scope for an original mind in the introduction of a longer and narrower card for three-quarter and full-length portraits. Where is the bold man who will dare to lead the album-makers, instead of being led by them?

GERMAN CORRESPONDENCE.

BY DR. VOGEL.

Death of Mr. Voigtlander—Durability of Pigment Prints—Dr. Elder's Works about Photo-Chemistry of Chromates—Magic Lantern and Astronomical Photography in Germany—Dr. Vogel's Hand-Book, Third Edition.

Dr. Vogel, writing to our Philadelphia contemporary, says:—

"On the 7th of April, 1878, died in Braunschweig the well-known optician, Voigtlander; the world is therefore deprived of a man who commanded great credit for the development of photography. Where should we be in portrait photography if Petzval had not calculated the lens which Voigtlander put in practice? How splendidly he carried out Petzval's ideas is generally known. Thousands of his lenses were quickly spread all over the world, and gave to the photographer the means to produce a picture in just as many seconds as formerly minutes were required. This is the greatest of all optical inventions in the limits of photography. How many new lenses were ever constructed after the portrait lens that maintained its standpoint as the most important instrument in every studio? Excepting a little modification by Dallmeyer, it has not received any change since it first came out.

"Voigtlander was born in Vienna in the year 1812, where he was known as an excellent optician before his acquaintance with Petzval. His orthoscope, made also after Petzval's calculations, has had less success. In the year 1848 Voigtlander moved to Braunschweig, where he died. His son, Frederick, who lately succeeded with the construction of the euryscope, carries on the business."

After some remarks on Dr. Van Monckhoven's recent paper, he continues:—

"According to Dr. Elden, who publishes an excellent work about photo-chemistry of chromates, the chromates of chromium are never a steady composition. Oxide of chromium shaken with bichromate of potassium will take more or less chromic acid, according to the time in which this separation is performed. Elden's publication merits all attention from photographers on more than one point of view. He has not only collected the literature of the chromates, but also made numerous experiments for the profit of the decision of many obscurities on this subject. He always considers closely the relation of chromates to gelatine, albumen, and gum, observations of greatest interest for the lichtdrucker, heliographer, photo-lithographer, carbon printer, &c. It is surprising to learn from him that the famous Nelson gelatine is less applicable for lichtdruck, on account of its little strength, than other gelatines; further, that gelatine mixed with alum binds the latter so intimately that neither warm nor cold water is capable of washing it out again; that consequently the much-recommended method for purifying gelatine (swelling in water and pouring off of the latter) is of no use whatever. Gum and albumen mixed with chromate are insoluble. Neutral chromate of potassium forms with gelatine twenty to thirty times less sensitive films than bichromate of potassium. Better effects are obtained by chromate of ammonium. Trichromate of potassium is not applicable for pigment printing. It is not my intention to mention every item of this interesting work, composed of eighty-eight pages, and therefore content myself with having called your attention to the same.

"Two important applications of photography, long since known in America, have found their valuation in Germany too: first, the application of the magic lantern in lectures; second, the use of photography for astronomical observations. I found great opposition while recommending, eight years ago, the magic lantern for schools. It was asserted when, on my account, ten sciopticons were introduced, that a picture suddenly thrown on a screen could not have the same edifying effect on the audience as a picture drawn (by-the-by, it is forgotten that many teachers do not know how to draw, or do not find the necessary time; now they learn to appreciate its value better).

"In the new palace of science, the Natural-Philosophical-Physiological Institute of Berlin, there has been arranged in two great lecture rooms all the necessary apparatus for the objective representations of not only pictures, but also physical and chemical processes. In regard to astronomical photography, M. Janssen, of Paris, has recently obtained magnificent results. His picture of the sun, showing the strange growing surface, has created just as much astonishment as formerly did the moon pictures by De la Rue and Rutherfurd.

France has been less successful at the transit of Venus expedition; whilst the present results are of very little account, the Germans proved at least that, under certain atmospheric circumstances, the method of observation by means of photography has decidedly the advantage over the ocular observation.

"Henceforth we shall have a great astronomical-photographical observatory in Potsdam, near Berlin. A number of beautiful new buildings, very romantically situated on the Havel, on the summit of a picturesque hill, serve as the astro-physical observatory; a great part of the same is devoted to photography. A separate tower is erected, with a skylight on the top, for the establishment of the photo-heliograph, and the reproduction of the obtained results. There are plenty of dark-rooms and other photographic departments, and the best opticians are occupied to furnish for this new institute the best possible instruments. Tohröder, of Hamburg, furnishes the heliograph; its telescope is stationary, inclined downwards, pointing to the mirror of a heliostat, which reflects the rays of the sun into the telescope. The picture of the sun formed in the focus of the telescope is enlarged by the ocular lens. Everything will be completely arranged in the course of a few months, and the best results are to be expected from the zeal of Dr. H. C. Vogel (my namesake) and Dr. Lohoe.

"Among other photographic news, I have still to mention that the third edition of my *Hand-Book of Photography* has appeared published by Oppenheim, of Berlin.'

Correspondence.

COMPOSITE PORTRAITS.

Sir,—The present communication will possibly further illustrate the admitted fact that many improvements and discoveries have originated either from accident or in searching for something else; and also that two persons, though unknown to each other, will make similar discoveries at much the same time.

In the last issues of the Photographic News there appear articles on "Combination Photography in Portraiture," including the paper upon the subject read before the Society of Arts.

Mr. Galton, it seems, has been in search of a method of obtaining special anthropological types, and is of opinion that he has succeeded in doing so in a sufficiently satisfactory manner. To your eyes, however, it would seem that, in the instance given, the composite portrait "bears a much stronger resemblance to one than to either of the other two;" and the engraver (no doubt a practised artist) "has made the resemblance still stronger."

As one of the results of his experiments, Mr. Galton is disposed to believe that "if several photographs of a person were taken at different times, perhaps even years apart, their composite would possess that in which a single photograph is deficient." I am certainly at one with Mr. Galton in the opinion here stated, and am confident that the most essential attribute of a portrait—namely, expression—is not only improved, but acquires greater characteristic fidelity. There is also given an effective appearance of relief and rotundity to the face, to a very surprising degree. I am at variance with him, however, as to the *modus operandi*, and hold that it is not always reliable.

The mode I am about to describe is both practicable and reliable in a high degree. But before entering into details, will you kindly permit me to mention the circumstances that led to its adoption?

Mr. Matthews, of this city, a very talented man, had gone pretty deeply into the Tichborne controversy, and the conflicting testimony which that case involved. He procured enlarged copies of the Chilian Daguerreotypes, and also photographs of the Claimant, and by geometric admeasurement found them to coincide, and he afterwards devised an appliance, resembling in principle a camera-lucida, which he called an Identiscope, wherein both the said portraits were placed, and shown to be capable of perfect permutation the one into the other. Having been shown this apparatus, I was requested to make a photographic "blend," or "composite," or "combination"—select which term you will.

For that purpose, having pinned one of the portraits to a copying board, I took therefrom a negative; then, without moving the camera, I placed the other portrait at the same spot, and from that produced also a negative. Now, the portraits, when handed to me, had been both already marked with lines that were in mathematic agreement with each other, and, being of precisely the same size, I found it very easy indeed to adjust the one upon the other. Then I proceeded to print from the two negatives thus combined, and, strange to say, though neither of them was very dense, it took two days in the sun to print, and even then it had been not quite long enough. It thereupon occurred to me to make a transparency (by contact) on a dry plate, and then, by putting the two transparencies together, I was able to produce three several and different negatives. The result I enclose, and you will see an appreciable difference in the expression of each. No. 1 has the film of the younger portrait facing the lens. No. 2 has the elder one facing the lens; and No. 3 is taken from the back. Nos. 4 and 5 are those from which the composites were taken.

I now leave the matter to you, hoping you may deem it of sufficient interest to the profession to give it insertion in your valuable columns. If I had not already overstepped the boundaries of your space, I should here give a more exact detail of the method in this, or in any maybe case, followed for minutely superimposing the portraits by the geometric lines, &c.—I am, sir, respectfully,

L. Lowenthall.

14, *Narrow Wine Street, Bristol, June 12th.*

RAPID DRY PLATES.

Sir,—In common, doubtless, with other dry-plate workers, I have looked forward with interest for the report promised in your issue of the 3rd ultimo upon "Swan's Plates," for which the manufacturer claims a sensitiveness from twice to four times greater than that of ordinary wet plates. Pending your report, it may not be uninteresting to your readers to hear a brief report from an amateur who has had some experience in dry-plate work—principally with the uranium and Liverpool plates.

The moment I saw Mr. Swan's advertisement I wrote for some of the plates, and, after taking all necessary precautions in regard to the lighting of my "dark-room," proceeded to give them a trial. My first efforts were not altogether successful; I found difficulty in washing the plates so as to remove all greasiness and cause the developer to flow evenly over the entire plates up to the edges; but, on communicating with Mr. Swan, he advised me to try the addition of one grain of gelatine to each ounce of the pyrogallic developer. I did so, and with perfect success. I now find no difficulty on this head, as the developer flows evenly to the edges. Indeed, I now work the plates very successfully, both in portraiture and landscape work.

In portraiture in the open air I have taken good negatives in two seconds under conditions of light which would have required from ten to fifteen by the wet process. I have also in bright days (but not in direct sun-light) obtained capital printing negatives of horses and a dog in one second. That is with as rapid an un-covering and re-covering of the lens as possible.

Landscapes I have taken in from two to six seconds according to conditions of light, with a Ross' 8½ by 6½ rapid symmetrical lens, and No. 2 stop (about 1-26 of focal length of lens?); and a professional photographer who has seen the prints pronounces that the negatives were over-exposed! A few days since I took the plates to Mr. Graham, who is esteemed to be the best artist here, and whose portraits are certainly high-class photographs. He took four portraits of me, exposing the plates in his studio under conditions of light which would have required from fifteen to twenty-five seconds by the wet process. He exposed for two, four, six, and eight seconds respectively. All the longer exposures were failures—that is, they were, especially the two last, much over-exposed; while the two seconds' exposure gave a perfect negative, as good, he remarked, as any negative he had ever taken by the wet process; and he was so convinced of the value of the plates for studio work that he wrote for a batch of them. To day I took an excellent negative of a pair of horses and carriage in one second.

There can, then, I think, be no question that Mr. Swan's plates fully come up to the specification. Then rapidity, the simplicity of development, the structureless nature of the film, giving prints soft and full of vigour and half-tone, and the toughness of the film, which will bear an immense amount of rough handling, and doing away with the necessity for varnishing, are qualities which must, I think, lead to their use both in the studio and for out-door work, in supercession of the wet process altogether; and if Mr. Swan can see his way to cheapening them a little, the process will be as economical as it is rapid.—I am, dear sir, yours faithfully, J. W. Ranking, Surgeon-General.

Welford Lodge, Leamington.

Proceedings of Societies.

Berlin Association for the Promotion of Photography.

This Society met on the 26th April—Professor H. Vogel in the chair.

The **President** announced to the meeting the death of Herr Von Voightlander, whose researches in the field of optical science had been of so much service to photography.

Messrs. **Strumper & Co.**, of Hamburg, reported with regard to the spots on negatives coated with gelatine previously to being transferred, observed by Herr Schahl, and mentioned by him at the meeting of the 15th February. According to their views these spots are due to drying at a non-constant temperature. The reason why an inequality of temperature produces this result, they have not been able to discover; but they are led to the conclusion they have stated by the fact that negatives, when coated with gelatine and placed in the drying-oven at a constant temperature of about 37° C., have never shown any spots. These have only appeared on negatives which, not being quite dry at the end of the day's work, have been left in the drying-oven till the morning, when, owing to the decrease in the gas pressure, the temperature has not been maintained at the same height. Messrs. Strumper and Co. therefore recommend, as the surest means to avoid spots, the drying of the gelatinised negatives at an even temperature, and in a place perfectly protected from any air-draughts; it should be effected, if possible, in a drying-oven, which must be kept open, and should take place rapidly—though not too much so, as that will cause the film of gelatine to detach itself.

Herr Schahl thought it quite possible that the reasons assigned by Messrs. Strumper were correct; it had never suggested itself to him that an unequal temperature could produce the effect in question.

The President exhibited Volhardt's method of assaying for determining the amount of silver in photographic baths, a method which, as far as the manipulation is concerned, resembles that of Vogel. In both methods, the same burettes and pipettes are used, but instead of the solution of potassium iodide employed in the method of Vogel, ammonium sulpho-cyanide is used in that of Volhardt. Six grains of this salt are first dissolved in 1000 grains of water; the burette is filled with this solution, which is then tested. For this purpose is taken a solution of silver containing accurately 10 grains of silver salt in 100 c.c. of water, and to 1 c.c. of this solution is added the same quantity of a solution of iron sulphate, 5 parts; water, 100 parts. This latter solution has the property of turning deep red with ammonium sulpho-cyanide, but in the presence of a silver salt the colour will disappear, silver sulpho-cyanide being formed. For testing, therefore, the solution of ammonium sulpho-cyanide is slowly dropped in, shaking the mixture at each drop, until the colour formed remains after the mixture has been well shaken. Suppose that 7·8 c.c. has been used—this will prove the presence of exactly one-tenth gram or 10 per cent. of silver. The solution is therefore diluted from 780 c.c. to 1000 c.c., and if it be now poured into the silver solution to be tested, every c.c. used shows a one per cent. amount of silver salt. The sulpho-cyanide test offers the advantage that only one fluid—the solution of iron salt—is required as an "indicator," whereas in Vogel's process two fluids (freshly-made solution of starch and nitric acid) are used. But the blue colour of Vogel's test is much more marked (because complementary to the yellow of silver iodide) than the yellow of iron sulpho-cyanide.

Herr Richter preferred Vogel's method of testing, because the solution of potassium iodide is permanent, whereas the same cannot be said of the sulphocyanide. The difficulties of that method are also much less where the operator has any experience.

Dr. Vogel allowed that potassium iodide could be procured chemically pure from the manufacturer, while the sulpho-cyanide could not be relied on, and must be tested. He had never observed that a test solution of the latter salt was liable to decomposition.

At the meeting of the 3rd of May, Professor Vogel in the chair, Baron des Granges exhibited a large number of his beautiful landscape photographs, which he presented to the Society. Among them were two full-sized panoramic views of Sparta and Athens, and a set of picturesque scenes in South Tyrol. Herr des Granges also drew the attention of the Society to Durand's quick printing sensitized paper, with which he had become acquainted through an Englishman whom he had met on the Riviera. It is stated that the paper will keep quite well for three months. The speaker also praised the Euryscope No. C, a picture taken with which he submitted to the meeting; he further noticed the new symmetrical and universal lenses of Ross. The exhibition of a set of Japanese pictures by Dr. Von Weissenbach, of Nuremberg, brought the meetingto a conclusion.

PHOTOGRAPHIC SOCIETY OF FRANCE.

The monthly meeting was held on the 3rd May, M. Davanne, President of the Administrative Council, in the chair.

Messrs. England, Jennings, and Warnerke, exhibitors in the English Section of Photography at the International Exhibition, attended the meeting, and were presented to the Chairman.

Extracts from the French and foreign journals which might have interest for the Society were read. Among these was one by M. von Bibra, in the *Journal de Chimie*, describing a method of restoring the writing of old manuscripts and the colours of oil paintings which have faded or become discoloured by age. For the manuscripts, the writing is treated with recently prepared ammonium sulphide, and in the course of a few moments the characters become distinctly visible. Any excess of the re-agent must be removed by washing in cold water, and the manuscript is then dried, either by gentle heat or by means of blotting-paper. Should the characters fade again after this treatment, they should be submitted to the action of a solution of tannin. As it is only in far distant times that carbon writing fluids were used, and as nearly all the more recent manuscripts have been written in gallate ink, it may be said that M. Von Bibra's method can be employed with any writings. For the oil paintings, after having dusted them with a wash leather, they are washed with a sponge and fresh water; they are then covered with a solution of soap (the author recommends shaving soap—probably that which is known in France as *creme de savon*), which is wiped off with a brush after the lapse of from eight to ten minutes, and when the soap has been completely removed the painting is allowed to dry. It is then rubbed with a soft linen cloth soaked in nitro-benzine, which restores the lustre. Lastly, a little olive oil is passed over it, and it is varnished with a white varnish.

In the *Bulletin de l'Association Belge*, M. Laoureux describes a method of substituting paper for glass in taking negatives. The waxed paper, as in the usual process, is overlaid with talc, and then coated with collodion like an ordinary glass plate. It is exposed in the camera by means of the slides ordinarily used in the paper process; then, having been treated as an ordinary negative, it is placed, while still wet, on a plate, slightly warmed, and covered with a mixture of glycerine and gelatine. The pellicle bearing the negative detaches itself easily of its own accord. The gelatine solution recommended by M. Laoureux is composed of—

Gelatine	20 parts
Water	100 ,,
Glycerine	2 to 4 ,,

M. Michaud exhibited to the Society some metal plates engraved by his photo-chemical process, and some impressions taken with them.

To Correspondents.

Big Hypo.—We do not know of any cement for glass vessels used in photography than marine glue; but it requires a special mode of using. Make the surfaces hot which have to be joined; then melt the marine glue by means of a flame, as you would sealing-wax. Or you may melt a little in an iron spoon over the fire. There are many excellent cements for glass and china not suitable for contact with silver solutions. A wooden tray or dish well varnished inside, or treated with paraffin, or with pitch, will answer very well. 2. The spots are of a class which puzzle us. They may possibly be spots of imperfect fixation caused by the formation of air-bubbles on the print whilst it was in the fixing bath. But we have known similar whitish spots when no error in manipulation was present. We remember Mr. R. Manners Gordon being troubled with a similar tendency, which was finally traced to the albumenized paper, which had been kept some time in a damp place.

J. J. H.—Steinbach is the name of the maker of the Saxe paper; but we do not remember his address.

Hypo.—Your case is very similar to one mentioned above, and the fact that in both cases there is recent plastering and use of mortar going on near the printing suggests that particles of lime dust may really be the cause.

W. Bertram.—We have published many articles on Lichtdruck; sometimes under that name, and also under the various other names used to indicate this process. It is most commonly designated photo-collotype or photo-collography in this country. Sometimes it is called Albertype. The volumes of the News and our Year-Books during the last six or eight years have contained full formulæ and many articles on the subject.

B. L. R.—Your prints have been handled, during the progress of printing, by fingers which have been in contact with hypo. This is the cause of the stains.

R.—There is no reason why carbon prints should not be made with Indian ink only; but the common aim is to secure something like the colour of a gold toned print. You can obtain such tissue of the Autotype Company, under the name of "engraving black."

G. F.—Your collodion has simply lost the bulk of its ether. You may restore it by adding fresh, pure ether.

A Young Hand.—You may not copy photographs of public persons without permission, as in the majority of cases they are copyright.

W. Perry.—Thanks. We will try them. They seem very excellent.

Several Correspondents in our next.

The Photographic News, June 28, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Gelatine in Carbon Printing—The Assistance of Photography in Map-Making—Swan's Dry Plates—The Potsdam Observatory.

Gelatine in Carbon Printing.—Carbon printing is a subject which cannot be too much ventilated at the present moment, when its general adoption in photographic studios is still under consideration, but we doubt whether the long controversy about alizarine was altogether worth the attention bestowed upon it. It seems to us as if the point in question has not been so much the production of permanent prints, as whether you can obtain carbon pictures which will fade if you give your mind to the job. Our opinion is that such a thing is possible, and that any competent photographer is quite capable of producing fleeting pigment prints, if he will take sufficient care and employ only fugitive colours, or search out chemicals calculated to react upon one another. But we have no such end in view. On the contrary, we want permanent pictures, or prints as nearly permanent as possible, and if ordinary pigments are employed, whose lasting qualities are well known, then lasting pictures are the result. We wanted no one to tell us it was possible to obtain fleeting pigment prints. Most people were aware of the fact already, and none would be much interested in the circumstance. Instead of discussing such an obvious proposition, it would be better, we hold, to spend time in improving, or seeking to improve, the nature of the gelatine we employ, and to learn more of its behaviour under various circumstances. In Dr. Liesegang's manual of carbon printing, of which an excellent translation has just been made by Mr. R. B. Marston, and published by Sampson Low and Co., there are all directions given for the making of carbon tissue, and as to the choosing of pigments, upon the permanency of which, as a matter of course, great stress is laid. There are also directions given as to the kinds of gelatine suitable for making tissue, and of the impurities which it is likely to contain. Dr. Liesegang suggests the testing of all samples of gelatine, and says :—"In order to test the purity of a gelatine, a little of it is put into a clean glass with cold distilled water, occasionally shaken, and allowed to stand for some hours. (The superposed water should not turn the blue litmus paper red.) It is then poured into a test tube, and a few drops of a solution of chloride of barium or nitrate of lead mixed with it. If there is no deposit, the gelatine can be used." If to this chemical test could be added a few physical tests to guide one as to the character of the gelatine to employ, we believe a far more uniform and trustworthy tissue could be produced; for uniformity of tissue is the great desideratum now-a-days as every carbon printer will maintain who enjoys much practical experience in the matter. He is quite willing to trust to the permanency of his pictures; what he desires is, day after day, tissue that shall display the same character, and not on one occasion be most delicately soluble, and on another behave more like patent leather in the warm water tank than anything else. We will run the risk of the lampblack in our prints fading, if tissue makers will only give us a better vehicle for it.

The Assistance of Photography in Map-making.—The Austrians are saving much time in the production of their ordnance maps by having recourse to photography. The ordinary method of map-making is to secure a tracing first of all, and then steadily to engrave the whole of the work upon copper. Then from the copper plates the maps are printed. Austria has now adopted the common-sense plan of dispensing altogether with the tedious, time-taking, and costly process of engraving, and has recourse instead to the camera to do the work. The maps are produced on a large scale on paper, by hand, draughtsmen using brush or pen in making the lines; and one map having been made in this way, nothing is easier than to secure reductions by means of the camera. Photo-litho. negatives are taken, and transfers secured, which may be put upon stone, zinc, or copper, and thus printed off in the ordinary way. In Austria copper is employed, as the work is then a little more delicate than in the case of ordinary lithography. The time saved by this plan of working is obvious, and our only astonishment is that it has not been resorted to before in map-making establishments. Such a process has been conducted for years in some establishments, and we have seen it in operation at Mr. Baden Pritchard's photographic department at Woolwich, where all War Office diagrams are multiplied in this manner. The lines of the original diagrams are made somewhat thicker for the purpose, and then there is no difficulty in making reductions, and getting the lines clear and transparent in the negatives. At the Ordnance Survey at Southampton they make good use of photo-lithography or photo-zincography, but we do not think it is employed in original map-making as at Vienna. It takes a long time to introduce radical innovations of this sort, especially when there are vested interests to be considered.

Swan's Dry Plates.—Rapidity in dry plates is no novelty—at any rate, so far as theory is concerned. In fact, there never was an inventor of a dry plate process yet who did not claim rapidity as its special feature. We do not know if the "lightning process," much spoken of in America, is applicable to dry plates; but whether it is or no, correspondents are beginning to speak disparagingly of it. We are glad to see practical testimony borne to the value of Mr. Swan's new plates, to the rapid character of which we referred some months ago. Surgeon-General Ranking, who has made some experiments with the Swan plates, gives a very good account of them. He says that he has "taken good negatives in two seconds under conditions of light which would have required from ten to fifteen by the wet process." If the plates can be trusted to act as quickly as this, they will be indeed a boon, especially as the prints they yield seem to leave nothing to be desired. The films, moreover, the same experimentalist assures us, will bear an immense amount of rough handling, a quality which should recommend itself to young amateurs especially. The only proviso that Mr. Ranking makes is: "If Mr. Swan can see his way to cheapening them a little, the process will be as economical as it is rapid." We should be glad to hear further testimony of Mr. Swan's plates, for if such results as those Mr. Ranking speaks of can be uniformly secured, there can be no doubt of the value of the process to amateurs and travellers, whose number is every day increasing.

The Potsdam Observatory.—The Photo-astronomical Observatory at Berlin is well-nigh finished, and London will soon be the only big metropolis unprovided with such an institution. The Meudon Observatory near Paris, under the direction of M. Janssen, has already become famous, although it has been in existence but a few years, and scarcely a month passes without records and observations of value being secured. M. Janssen had to encounter great opposition before he was permitted to establish his observatory in Paris, and began first of all by pitching some tents on the Buttes Montmatre. Now he is firmly established at the Chateau de Meudon, where he will, no doubt, be permitted to rest undisturbed. Germany has soon followed suit, and the photo-astronomical observatory in that country is building at Potsdam. Dr. H. C. Vogel is named director of the establishment, and some very fine instruments are being constructed for its use. Photography, as at Meudon, will play a most important part. Instead of the observations being made by the eye, they are to be recorded on a photographic film, and in this case the most minute phenomena will be set down. In the case of solar photography the camera can be employed with far better results than the human eye, for where the light is of a blinding character, all that is necessary in the case of a sensitive plate is to shorten the exposure sufficiently. M. Janssen obtains the most striking of his solar photographs with an exposure of one-three-thousandths of a second, an interval which it is needless to say the human eye could not appreciate. At Potsdam, we are told, instead of the photo-telescope looking upwards towards the sun, it will incline downwards and look into a mirror, in which the disc of the sun will be reflected. Every requisite for the carrying out of photographic work is to be found at the Potsdam Observatory.

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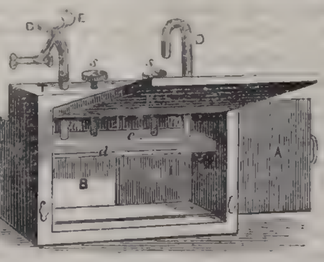
A PIECE OF APPARATUS EMPLOYED IN RESEARCHES IN PHOTOGRAPHING SPECTRA.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

It will be in the recollection of the Society I expressed a hope that I might be able to perform some experiments in atmospheres free from oxygen, and thus to offer a confirmation of the theory I had propounded. There were certain mechanical difficulties in the way which required a little consideration, particularly when, for economy's sake, it was desired to use the same apparatus to experiment with oxidizing as well as with deoxidizing agencies. At last I devised a dark slide which seemed to fulfil the part I required, and got Mr. Meagher to carry out my design. The accompanying sketch shows it.



The slide is increased in thickness in order that it may be wide enough to hold a glass cell of half-inch width, in which the plate can be placed in solutions, or exposed in an atmosphere as required. A is the front of the slide, which is shown half drawn out, and B is the place in which the cell is placed. C is a wooden slab, on which a layer of india-rubber, *d*, is placed, as in the ordinary travelling bath tops. Through this top pass two glass tubes, *m m*, passing also through the top of the slide, T. On to these tubes are fixed india-rubber tubes, D D, which can be closed by clips such as E. The back of the slide is closed by the flap, K, to which the usual spring is attached. At each end of the front of the glass cell are glued two little strips of glass, against which the sensitive plate rests, and the latter is pressed against them by means of a platinum or silver spring inserted between the back of the cell and the back of the plate. If a solution is to be experimented with, the solution is first placed in the cell and the plate dropped into position, and the spring inserted. The cell is then placed in the space prepared for it at B, beneath the top, *c*, which is carefully screwed down by means of the screws, *s s*. The back is then closed, and the slide is ready to place in the camera.

When using gases the plate is placed in position, the top is screwed down, and one of the india-rubber tubes placed in connection with the gas holder or gas generator. For example, in filling the cell withhy drogen, one of the india-rubber tubes is connected with a long glass tube filled with calcium chloride, and through this the hydrogen passes after bubbling through a solution of silver nitrate direct from the generator. By keeping up a quick flow of hydrogen the cell is filled in a very short time, and after ten minutes any oxygen remaining must be immeasurable, and not enough to vitiate the experiments. In the case of nitrogen, the cel is first filled with hydrogen, and then this displaced by the heavier gas.

A very fair vacuum can also be made by attaching one of the tubes to the air-pump or sprengel pump, after stopping the access of air through the other tube by means of a clip. When the vacuum is nearly complete this tube may be connected with a vessel holding the gas; and when the clip is opened it will rush in and fire the cell. After exhausting once more, and refilling the cell with the required gas, exposure may be made in an atmosphere *very* nearly free from oxygen.

The sides and the cell can be cemented with marine glue, in which case a plate may be exposed in any atmosphere or in any solution, which is unaffected by marine glue. By cementing the sides with common glue and treacle, an arrangement is made by which exposure may be made in such liquids as naphtha, alcohol, &c.

I have communicated the results of experiments, already made with this arrangement of slide, to the Royal Society, and I was in hopes that I might have been able to have given this Society a fuller description of them than I have in the paper sent in to Burlington House; but, unfortunately, owing to circumstances, my communication will not be read till the 14th instant. Owing to this my mouth is closed till after that time, and I can only say that the theories which I have ventured to promulgate seem to be fully confirmed, and that the experiments point to conclusions which, if correct, cannot fail to be valuable to the practical as well as to the theoretical photographer.

In the interval which will elapse between this last meeting of this session and the first of our next, I hope, if nothing unforeseen occurs, to be able to give the results of new explorations in fields akin to that I have already travelled over.

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ENAMELLED SILVER PRINTS.

BY FRITZ HAUGK.*

In the *Photographisches Wochenblatt*, Herr Fritz Haugk gives directions how to prepare durable paper for glacé or enamelled pictures: Take some good albumenized paper and float it as usual on a one-to-ten silver bath. When the paper has floated long enough, which will be in about two minutes, lift it slowly up and draw it backwards over the edge of the bath, and lay it between sheets of clean blotting-paper, so that when looked at from the side it will have a perfectly equal but somewhat dull appearance, quite free from any shining, marble-like marks. In this half-dry condition the paper is laid, film side undermost, upon a bath containing

Water	400 cubic centimetres.
Gelatine	5 or 6 grammes.
Chloride of sodium ...	5 ,,

And, being repeatedly lifted up and laid down again, it is allowed to float until the gelatine film formed adheres closely and equally to the albumenized silvered film. The paper is then dried at a gentle heat and is ready for use.

Paper prepared in this way, it is said, will keep as long as washed silvered paper. Like the latter, also, it requires to be fumed with ammonia, after which it is treated like albumenized paper silvered in the ordinary way. Care must be taken not to wash off the gelatine covering, to prevent which it is advisable to keep the pictures printed on gelatine paper separate from the prints on ordinary paper, and to use the chemicals and washing water rather cold. The water used for washing must also be perfectly free from dust or dirt, as the particles would be apt to settle on the softened gelatine.

The proportions given for the gelatine solution should also be adhered to, as, if more gelatine were added, the film would be thicker and would swell up and so be easily injured. The quantity of salt should not be increased either; as, when there is a great amount of salt present, even when the paper is well fumed, the prints are flat; indeed, the quantity of salt might with advantage be lessened. If it be wished to use the same gelatine solution several times, it must be stored in the dark after each time of using, because it contains a little chloride of silver in solution.

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* *Photographic Journal.*

* *Photographisches Wochenblatt.*

Prints which do not require to be spotted may be placed upon the collodionized glass immediately after the last washing. A two-per-cent. collodion is used, and when it has dripped sufficiently the plate is laid in a vessel containing water until the water runs clean off. The prints adhere easily, and, with a little care, quite free from air-bubbles, to the collodion film; but, even if a few air-bubbles should be formed, they are easily removed by a slight pressure with the squeegee.

To mount the pictures, let the print dry for five or ten minutes upon the collodionized glass; then paste the back of it with some fresh paste to which a little gelatine has been added; lay the cardboard (which has previously been moistened for a short time in water and then dried with a towel) upon it, and smooth it down with the wooden back of the squeegee. When the card sticks fast to the print, leave the whole to day spontaneously. When perfectly dry, push the point of a knife between one corner of the print and the glass, and the former will spring off. With regard to pictures which require to be spotted, these should not be placed on the collodionized plate directly they are taken from the last washing water, but must be dried. To dry them, Herr Haugk recommends rather a peculiar plan. He sticks them, film side outwards, against a door which has been oil painted, and when they are half dry and fall off, he spreads them out on a table to become perfectly dry. The spotting presents no difficulties, as the India-ink adheres well to the gelatine film, and had better be rubbed down in a very thin solution of gelatine. When the ink is dry, place the prints in water for a few minutes, and then finish as above.

REVERSED NEGATIVE PROCESS.

BY J. B. OBERNETTER.*

[The following is the text of Herr Obernetter's description of his reverse method to which we have made recent allusion.]

Aided by the emulsion process, our new reversed negative process has lately made a great success. Warnerke's prescriptions for making emulsion are so reliable that success is sure when properly followed. Nevertheless, whoever has worked with bromide of silver emulsion knows how provoking it is when, after having worked during several days with the greatest care, finally a little accident makes the whole work a failure. As for myself, the emulsion has assisted me considerably when experimenting in making photographs of different colours. Exposures through coloured glasses or liquids are very tedious, as they require a long time, and never give harmonious negatives, whilst coloured collodion films give the same results, and always harmonious negatives.

Trying to produce negatives for polychromy, I needed several coloured collodions, all differently prepared; the colours often spoilt my bath, and the preparations of several collodions is also very inconvenient. I thought to reverse the whole process, which I did with the best success. The theory is very simple. I make a silvered collodion, and use a bath of bromine and iodine salts. By constant trying, I am enabled to establish a list of formulæ which I gladly offer to the public as material for further experiments. The preparations are simple, the manipulations the same as in the common wet process, and the exposure may be extended during several days without any disadvantage; the sensitiveness can be augmented, and the collodion coloured with all kinds of pigments without affecting the bath. Finally, the results are exactly the same as those obtained by the process actually in use. With one collodion I make three different kinds of plates—pure bromide of silver plates, pure iodide of silver plates, and bromo-iodide of silver plates. The latter have the same sensitiveness and give the same results as our common wet plates.

1. *Collodion.*—Put five grammes nitrate of silver, one drop of nitric acid, and two cub. cent. of water in a so-called half-litre vessel, and warm it to dissolve in the silver; add two hundred and fifty cub. cent. of alcohol of ninety-six per cent., six grammes of cotton, and one hundred and fifty cub. cent. of ether. After everything is dissolved and filtered, let it stand several days, after which the collodion is ready for use. This collodion is the starting-point for all other operations.

2. *Iodine-bromine plates* are obtained by collodionizing with the above collodion, and sensitizing with a bath composed of

Iodide of potassium	80	grammes
Water	200	„
Bromide of potassium	8	„

The whole process is not in the least different from sensitizing a common silver plate, requiring also equally long time. After sensitizing, wash on both sides with common water, and pour over the plate, twice, an eight per cent. solution of nitrate of silver; add also a little glycerine if the exposure is intended to be extended. After exposure the development takes place with iron, and without former washing. Instead of a sour developer, one may choose an alkaline developing solution.

3. *Iodide of silver plates* require a bath composed of

Iodide of potassium	1	part
Water	12	parts

These plates produce right hard negatives, and may be recommended especially for the reproduction of drawings in lines. I never have obtained equally good results before. The colouring is also easily applied. Add to the sensitizer (eight per cent. silver in water) an aniline blue, soluble in water or alcohol; the plate will get blue, and consequently sensitive for all colours but yellow. It is our printing plate for yellow.

4. *Bromide of silver plates* give weak negatives. When developed as usual with an alkaline developer, or treated as dry plates, they offer all the qualities which justice demands of dry plates. The sensitiveness can be greatly augmented, as I will prove below, and I hope to encourage many of my fellow business men to further experiments.

Intending to work with bromide of silver plates, I use a bromide of potassium bath, 1 : 12, in which the collodionized plate is sensitive. The phenomena are exactly the same as in the common silver process. After sensitizing, the plate is washed, exposed, and directly developed; any alkaline developer will answer. The following composition is the one which I use.

A.

Ammonium caust.	20-50	parts
Water	1000	„

No bromide of potassium.

B.

Pyro	1	part
Alcohol	10	parts

Mix one cub. cent. of A with four cub. cent. of B. The picture, which appears in about half a minute, is carefully washed and strengthened by means of a solution of

Water	100	parts
Nitrate of silver	2	„
Citric acid	3	„

which solution has to flow back into a bottle which contains the necessary quantity of pyro. Fixing takes place with cyanide of potassium, after which may be performed another strengthening, at one's option; everthing goes smooth and sure. Overflowed with certain sensitizers before exposure, one adds greatly to the sensitiveness. A preservative gives the simplest means for the formation of dry plates. The collodion may be coloured by all kinds of colours soluble in water or alcohol without influencing the qualities of the plate. Overflowed with thin glycerine the exposure can be extended one day; an addition of one-half per cent. of tannin or morphine solution doubles the sensitiveness; it requires, however, a further solution of bromide of potassium to the developer in order to prevent a foggy appearance. The sensitiveness will be astonishingly augmented by the application of a filtered solution of five grammes nitrate of silver in 100 grammes water. I cannot enough recommend in this case to be very careful that no light penetrates the dark room, as otherwise fog will be inevitable. Also here the colouring is allowed with all pigments. After exposure wash the plate, develop with an alkaline developer, and fix with cyanide of potassium.

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* *Photographic Times.*

Strengthening may be performed before or after fixing. The negatives have the peculiar character of alkaline developed bromine plates, as they show in the deepest darks all details without influencing the whites. Briefly, they have all the qualities of collodio-bromine dry plates, and offer the advantage of dispensing with the preparation of emulsion.

Some little changes in my prescriptions may add to the usefulness of my method. I conclude with the desire that everybody experimenting on this subject might publish his experience.—*Mittheilungen.*

FURTHER EXPERIMENTS ON YELLOW COLOURING MATERIALS FOR THE WINDOWS OF THE DARK ROOM.

BY DR. H. VOGEL.*

IN photographic circles general surprise has been expressed at the curious properties of chrysoidine varnish, which has been so highly recommended for colouring the windows of the dark room. Notwithstanding its intense orange yellow colour, this substance is less active in preventing the passage of actinic light than the pale yellow waxed silk. The more favourable opinion of Messrs. Eder and von Toth on the efficacy of chrysoidine varnish (see PHOTOGRAPHIC NEWS for March 1st, 1878, p. 105) will perhaps raise a doubt as to the correctness of my first report on this material; but it should be noticed that Messrs. Eder and von Toth experimented only with emulsion plates, and the results obtained with these cannot be said to hold without further trial of the substance with the ordinary wet iodo-bromide of silver plates also. The latter are much more sensitive to the violet and less sensitive to the light blue rays than the silver bromide plates.

The experiments which I described in the *Photographische Mittheilungen* go to prove that chrysoidine varnish will admit the dark blue rays which act so readily on the silver iodide more freely than it will the green rays. After the published statement of Messrs. Eder and von Toth, I was anxious to confirm my opinion by spectro-photography; but, unfortunately, owing to the absence of direct sunlight, I was for a long time unable to do so; it was not until the middle of February that a sunny day permitted me to make the desired experiments. An ordinary wet silver iodide plate was exposed to the sun's rays in my spectrograph, and four spectra, one after the other, taken on it. With the first a chrysoidine plate, with the other three a piece of Paris silk tissue, was held before the slit of the spectroscope. The time of exposure varied from one to two minutes, and the result was a most interesting one.

When the chrysoidine plate was used, the violet of the solar spectrum, about the lines H and H″, alone produced any effect; when, on the other hand, the yellow waxed silk was interposed, only the light blue in the neighbourhood of F appeared to have an actinic action. In the latter case, with a longer exposure, some slight effect was also produced at G, so that between F and G the colouring material of the waxed silk possesses an absorption band which is not visible to the eye.

Thus it appears that chrysoidine varnish transmits to a perceptible extent the violet rays in the neighbourhood of H, but not the blue rays; and as the violet light has a more powerful actinic effect on wet silver iodide plates, windows coloured with this varnish cannot be recommended for dark rooms where such plates have to be manipulated. For dry silver bromide plates the circumstances are not the same, as these plates are less sensitive to violet than they are to blue light; they are consequently not affected to the same extent behind chrysoidine window panes. By means of these results, the apparently conflicting statements of Messrs. Eder and von Toth, and of myself, can be satisfactorily reconciled, for those gentlemen only experimented with dry silver bromide plates. Further investigation on my part tends to show that the yellow Paris waxed silk will fade after some months' exposure, and become inefficacious. For use in a tent window this fault is of no importance, but when the fabric is intended for continuous service in the dark room its tendency to fade is not a recommendation.

In continuation of the above experiments, I undertook also to examine with the spectroscope the properties of a lamina of potassium chromate (1·60) of one centimetre thickness. This absorbs all the green, blue, violet, and ultra-violet rays so completely, that a wet plate exposed for three minutes behind it to sunlight gave not the slightest evidence of any action. In opacity to the chemically active rays, therefore, a solution of potassium chromate is far superior to the other chemical substances. Soret has shown that a solution of this salt is transparent to ultra-violet light, though only when in a very dilute state, a contingency which is of little consequence, inasmuch as the greater part of the ultra-violet rays are absorbed by the glass lenses in photographic operations.

More recently, Spiller has investigated the properties of chrysoidine, and compared them with coralline or aurine, which for some years has been used for the same purpose. He gives the latter the preference over chrysoidine, and that not alone for the optical reason that it is a better absorbent of the green and blue rays, but also because it is only soluble in alcohol, and not in water. On this account, it cannot so easily as the more soluble chrysoidine be washed off the window by condensed moisture. Paper saturated with an alcoholic solution of aurine, and dried, or highly coloured with the same substance, comes very close, in its power to absorb actinic light, to the red glass recommended by Messrs. Eder and von Toth. Spiller has also observed that chrysoidine, when used as a colouring substance, soon fades to a pale brown, and in that state is tolerably transparent to chemically active light. (See PHOTOGRAPHIC NEWS for 22nd March, 1878, page 134).

[We have recently tested some orange-coloured oil-silk and muslin supplied by Mr. Solomon, which answers exceedingly well. With the simple test of sensitive paper, we find that, protected by this silk, the paper remains perfectly white after half an hour of exposure to sunlight. The test of its use in a dark room window, which we are making, will require time; but we shall eventually report.—ED. P. N.]

DIRECT POSITIVE PRINTS.

BY CAPTAIN HANNOT.*

A WEAK collodion print, after being fixed, presents a double aspect: it is negative if viewed by transmitted light or against a white paper background; and it is positive if held against a black ground. In the latter case it gives an extremely delicate picture, which resembles a Daguerreotype, as far as softness of the tints is concerned; but has the advantage over it of not causing reflections. It is natural that great interest should attach to a process whose execution is as easy as it is rapid, for it is possible by this method to have one's portrait taken and to obtain a picture all completely finished, fixed, washed, dried, and framed in a remarkably short space of time. The exposure has been short—almost instantaneous; but a very good likeness is secured.

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* *Photographisches Mittheilungen.*

* *Bulletin Belge.*

The series of operations for taking a direct positive on collodion is the same as that for obtaining a negative; the following modifications only must be introduced. To make a collodion properly adapted for taking positives, it must be diluted to the utmost with ether and alcohol; it will be enough if it has sufficient consistency for the film not to tear in the silver bath. An excess of ether in the collodion gives it great tenacity and a higher sensitiveness. The amount of alcohol will depend on the temperature, in order that the collodion may flow easily over the plate; for, above all things, any wavy or streaky appearance must be avoided. As much pyroxyline must be used as will render the film, though extremely thin, yet strong enough to support the silver iodide which is formed in the bath. Regulate the proportion of iodide so as to obtain purity in the whites and delicacy in the shadows. If the former show a grey tint, it is a sign that the dose of iodide must be diminished. On the other hand, iodine is added to the collodion in order to obtain transparent shadows without veil or fog. When sensitized, the collodion should give a perfectly thin and transparent film of silver iodide, so that, in the fixing, the parts not affected by light may be easily dissolved.

The collodion which I use is prepared on the principles above stated according to this formula:—

Ether...	100 c. c.
Alcohol	50 ,,
Pyroxyline	1 gram
Ammonium iodide	1 ,,
Iodine...	a trace

In the sensitizing bath for positives there must not be so large a proportion of silver as in that for negatives. A five per cent. solution answers very well; but it must be strongly acidulated. Expose in the camera for a much shorter time: a third or quarter of the time required for a negative will suffice. Develop with protosulphate of iron only, not forgetting to add 1 gram of sulphuric acid for every 100 grams of the developing solution; the addition of this amount of acid has the effect of increasing the brilliancy of the whites in the positive picture.

On withdrawing the plate from the iron bath the picture should show negative on the white collodion film; it should be weak, and only just indicate the outlines. After washing, the plate must be fixed, when the picture will become positive and develop in a marvellous manner. It must therefore not be intensified, for by that means the picture would assume an ashen grey tint, which would destroy the effect of the contrast produced by the transparent shadows and the whites of the metallic silver. Should a slight fog show itself in developing, and not be removed by the fixing solution, a weak solution of iodine may be flowed on the plate, and allowed to act for a longer or shorter time, according as the fog is more or less intense; the plate is then rinsed in water, and plunged into a cyanide bath, when the fog will disappear. For fixing, sodium hyposulphite may be employed, though a ten per cent. solution of potassium cyanide is to be preferred, as it gives purer whites. It is advisable to dissolve a small quantity of silver chloride in the cyanide solution. The plate is then thoroughly washed, and allowed to dry.

These positive pictures are visible on both sides of the glass plate by placing behind it a piece of black cloth, or paper, or velvet. The whites have more brilliancy on the exposed side, but, of course, from that side the picture appears reversed. To increase the effect, either side of the plate may be coated with any kind of black varnish, though this may be avoided by working with black or dark green or dark blue glass; in America iron plates varnished black* (ferrotypes) are used.

Direct positive pictures on collodion may be transferred to oil-cloth. This produces an excellent effect, for the oil-cloth renders the shadows remarkably intense. A picture of this kind may be laid in a pocket-book, or carried in the coat pocket, and be subject to constant handling, without suffering any deterioration. More than that, sharply rubbing the picture with a piece of cloth will give it greater brilliancy, and render the shadows more transparent and vivid.

To transfer the picture, the plate must be dipped in water to facilitate the removal of the collodion; if it adhere strongly, the separation may be effected by plunging the plate for a few minutes in water acidulated with a little sulphuric or hydrochloric acid. It is then laid on a levelling stand and a film of water is flowed over it; on this film is laid a piece of oil-cloth cut rather smaller than the collodion film, care being taken to prevent the formation of air-bubbles. To render it flexible, the oil-cloth is previously warmed. The oil-cloth is then pressed with both thumbs firmly on to the glass plate, while the latter is raised with the fingers and held for a minute or two so as to allow the water between the two surfaces to drain off. The collodion ought now to adhere perfectly to the oil-cloth. Looking at it through the glass plate, no bubbles should be seen. When the adhesion appears to be satisfactory, the overlapping edges of the collodion are turned over and pressed on to the reverse side of the oil-cloth; the latter is raised at one corner, and gently drawn off from the plate. If the collodion film does not separate easily, it can be made to do so by allowing a jet of water to play in between the two surfaces. When the oil-cloth has been completely drawn off, it is placed, with the film uppermost, to dry, either in the open air, or on a plate which is gently heated. The collodion film will become quite dry in a very short space of time, and it will then adhere so firmly to the oil-cloth that it is impossible to detach it.

Some kinds of collodion are better adapted for this transfer process than others; the best are those which have a tough and resisting texture. For photographs which are to be transferred, choose rather a compact collodion containing less ether than usual. The transfer is facilitated by previously coating the plate with a very thin film of white wax, and this is effected by floating over it a solution of the wax in ether.

Negatives Transferred to Paper.—The want of adhesive power of the collodion film for the glass plate, particularly in its wet condition, can be turned to account in transferring negatives to thin paper, by which means very portable and durable negatives can be obtained. For this purpose an albumenized or gelatinized paper is chosen, which, viewed by transmitted light, shows an even texture. A piece of this paper is put to float on water, right side downwards, until it is sufficiently soaked. While still wet, it is laid on the negative, as was above directed to be done with the oil-cloth, and complete adhesion secured by pressing lightly with blotting-paper. When this is effected, a penknife is passed round the edge, and the paper, with the adherent collodion film, drawn off the plate. Negatives transferred in this way to paper have great vigour imparted to them.

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* They are made by coating the plates with a varnish composed of bitumen of Judæa, linseed oil, and lamp-black, and heating them in the oven.

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RAPID PHOTOGRAPHY.

It was a prevalent belief, in the early days of photography, that extreme sensitiveness was to be gained by the addition of various nostrums to the collodion, or silver bath, or developer. The collodion was, however, the favourite vehicle for the secret nostrum which was to secure instantaneity under any reasonable circumstances. All the haloid salts of silver, and almost all combinations of them, were tried, but the favourite idea was the addition or formation of an organic salt of silver. In the experiments of Mr. Maxwell Lyte, for instance, in which the excited plate was covered with a syrup of grape sugar and nitrate of silver, a high degree of success was said to have been obtained, perfect negatives of moving ships being obtained with a landscape lens of small aperture, on plates so prepared. After multitudes of experiments of this kind had been tried, the idea of seeking for such extraneous aids to rapidity was gradually discarded, and photographers began to rely for rapidity upon very simply stated conditions—namely, good chemicals in good order, good lenses, and good light.

The first part of these conditions, however, opens a wide field. What constitutes the good order of the chemicals? The term includes good formulæ for their preparation: and much rests on the formulæ. The prevalent idea of the best operators in the early days of collodion was that a simply iodized collodion, newly mixed, with a strictly neutral bath, gave the greatest rapidity. And there can be no doubt whatever amongst experienced photographers that a very high degree of sensitiveness may be attained by such formulæ. But it is attended by a drawback which would not be tolerated by the modern photographer. With such collodion and bath absolute cleanliness in negative is very difficult to secure. The extreme sensitiveness of the plate to the luminous image is accompanied by a still greater sensitiveness to streaks, stains, spots, comets, and fog. And further, every day the collodion is kept, when such conditions are aimed at, it is deteriorating and losing sensitiveness. The general introduction of bromides into collodion, and the use of iron development, abolished this mode of working, and introduced rapidity, with almost entire immunity from much of the mess of streaks and comets common under the old system.

The use of bromides and iron development was regarded as a deadly heresy by many of the old orthodox collodion workers. A special commercial collodion, recognized as being a simply iodized sample, was pointed to as the most rapid collodion in the market, and it for a long time held its position as one of the safest and best, as well as one of the most rapid collodions in the market. Its maker, Mr. Ponting, of Bristol, aided materially, however, in establishing the value of bromides and iron development. In a little volume which he published he described some careful experiments he had undertaken for the purpose of comparing the relative sensitiveness and excellence of simply iodized plates developed with pyrogallic acid, with the same qualities in bromo-iodized plates developed with iron. He entered upon the experiments with a prepossession in favour of the former, and a prejudice against the bromo-iodized plates. In the issue, however, he was quite converted. He found that the bromo-iodized collodion and iron development gave decidedly better and quicker results than the simply iodized and pyro-developed plates. He found, also, very definitely, that the silver bath for bromo-iodized plates must contain a trace of nitric acid, and that no advantage was gained by excess of bromide in the collodion: one grain of a bromide to four grains of iodide giving the best results. To this point we shall have occasion to advert again.

The quality of the pyroxyline has been recognized as possessing some influence on the sensitiveness of the collodion, but not to any serious extent. Any perfectly neutral sample of cotton sufficiently soluble has generally been accepted as meeting all necessities of sensibility; the varied experiments and discussions which at one time prevailed as to the best formulæ for pyroxyline having reference rather to the intensity of the resulting negative than to the sensitiveness of the collodion.

Rapidity of exposure has been found to be dependent upon energy of development, as a rule, more than upon special treatment of the collodion and nitrate bath. A strong iron developer will permit a shorter exposure than a weak one, as much as fifty grains of the iron salt to an ounce of water, and no restraining acid being permissible, where the bath and collodion are in good condition. M. Claudet at one time called attention to a marvellous reduction in exposure rendered possible by the use of formic acid in the iron developer, and other photographers of eminence have used a similar developer with similar results. A mixture of pyrogallic acid and protosulphate of iron has been used with similar alleged results as regards reducing the time of exposure. The use of the alkaline developer is not possible with free nitrate of silver present, and hence it cannot be used in the wet collodion process, or very great rapidity would be doubtless secured. In the wet emulsion process, the highest degree of sensitiveness is obtained by its use.

The condition of the nitrate bath is doubtless of considerable importance. General experience is in agreement in preferring a nitrate bath new, or nearly so; for rapid work, and neutral, or nearly so. As a rule, "doctored" baths are to be avoided when the highest sensitiveness is desired. There are some exceptions, however, to these general facts. Mr. Blanchard, who has had much experience with instantaneous work, speaks of a certain condition of "doctored" bath in which better results, and quicker, are obtained than can be secured with a new bath. He finds that a bath which has been treated with carbonate of soda, sunned, and filtered, yielding a reaction slightly alkaline from carbonate of silver dissolved in the solution, is in its best and most sensitive condition. Mr. F. C. Eliot also finds that a bath made alkaline by adding carbonate of silver yields, with a ripe collodion containing a trace of free iodine, very fine negatives with very short exposure.

The experience of Mr. Black, of Boston, U.S., attracted considerable attention some years ago, from the announcement that he secured marvellous rapidity with a bath made very acid indeed with nitric acid. The experiments of other photographers did not sufficiently confirm this experience to acquire any vogue for the acid bath. The kind of image obtained with such a bath is not encouraging. We remember many years ago we tried, for experiment, the addition of three minims of nitric acid to each ounce of negative bath. We obtained a degree of rapidity which startled us. The image flashed out in a second or two; but when finished it was a thin, grey, silvery image, which defied intensification, and the negative yielded a poor, grey, flat print. In the old days of iodized collodion the addition of a trace of acetate of silver in the bath was found of service, but with bromo-iodized collodions it is a decided retarder; whilst a trace of nitric acid is necessary to the best results.

The proportion and nature of the bromide is probably of more importance than has, as yet, been fully determined. On this subject, and on a method whereby greatly increased sensitiveness is obtained, we shall have something to say in our next.

MANAGEMENT OF THE LINES.

BY WM. HEIGHWAY.

We have so far considered only the outside lines of our composition, the general arrangement of the figure, and the effect, as a first impression, produced on the spectator. This most important consideration deservedly takes first place, but it is necessary, for the perfection of our work, that the interior lines of the picture should conform equally to the rules of Art.

Good lines have a Beauty and Significance.

Almost every eye finds pleasure in following a good graceful curve; the educated eye of the artist must, in a greater and more perfect degree. When the salient objects of a composition follow each other in a good curve, the eye experiences pleasure in this harmonious line of leading points, and thus the mind of the spectator is under the control of the artist, to be led in natural sequence from the objects of highest importance to those subordinate.

Thus we see that graceful lines are not only beautiful in themselves, and afford pleasure in their beauty, but are useful in their attractiveness.

In the brave, vaulting, ragged lines of the mountain scene, the story is eloquently told of an awful strength, now stilled, of the action of stupendous forces; each peak up-standing grandly as a monument to great and irresistible powers long since dead. The gentle undulations of valley calm and peaceful, a great harmony of quiet, with the suggested contrast of the great un-rest which brought the mountains into existence.

The beauty of a curve consists in its sweeping or springing character, starting vididly from its origin, and suggesting vital force and vigour.

The curves of leaves, and of vegetation, at once separate themselves from hard and monotonous curves, such as may be produced in any mechanical way. All the beautiful natural forms are irregular. In nature, we find repetition, but never monotony.

Our work principally lies with the drapery of our sitters, and in this we may find the greatest scope for artistic arrangement.

Many of the folds of a dress are more beautiful in their natural sweep than anything we could arrange, but still may be marred by others in opposition; and it will, therefore, be found necessary to re-arrange in some cases where unsightly lines appear, and to provide lines of compensation in places where it is necessary.

Suggestion of the form also is generally given by the direction of folds: these should never be destroyed. In supplying lines, or altering folds, strive to increase rather than diminish this effect.

You want to get a thoroughly true idea where the form is first—and then of the clothes covering it—and then, that the entirety is beautifully expressed.

But true! remember that! Don't rely too much on the beauty of the best line ever drawn, unless it is truthfully and intelligently used.

Whatever beauty there is in a line comes not of itself, but by its surroundings. A little readjustment of broken and ugly lines in a composition may develop many beauties otherwise swamped by mean surroundings.

You have already studied unity, variety, balance, and repetition—now apply these rules to the interior lines of your composition.

Be as careful of every line as you were of the general effect of the figure.

Careful—but not anxious. Don't let it appear that you have fussed and fretted over every fold. Let your Art be artfully concealed, or, instead of giving pleasure, your pedantry will cause annoyance and irritation.

Don't forget that there is a human being inside that dress, or coat and trousers, whatever else you forget. And don't niggle all form and roundness out of your figures. The dress is all very nice and proper, but, after all, it is the man or the woman that we want; the clothing is just an accessory.

The character of the material of which the dress is composed must also be faithfully kept. Don't lay yourself out on silk, and slight the soberer beauty of that old woollen gown.

The idea of motion is conveyed by the shape and direction of the folds. How many times do we see the perversely ingenious artist waste his time in striving to make the tail of a train stand on end, when all the motive of his picture says plainly it ought to drag.

Cut yourself adrift from conventionalism; or, perhaps, it were better to say outright—*think* of what you are about, and then honestly follow the dictates of your impressions.

Just study the lines of Thorwaldsen's "Night," and see if that gives you any ideas about the suggestiveness of lines.

PRIMITIVE RETOUCHING.

BY LYDDELL SAWYER.

Naturally, in retouching, one pokes one's nose so close into the negative that any ordinary observer might be excused for imagining that this salient member was being pressed into service in place of a stump. In this position (with probably the aid of a magnifying glass) we assiduously do battle to the death with every mark and freckle, and, at the same time, spend an unconscionably long period in carefully placing each touch at a proper interval from its neighbour.

All this care is doubtless commendable, but certainly misdirected, for when, with a sigh of relief, we finish, to the satisfaction of our minute inspection, and hold the negative at a distance, prepared to look with pride upon our persevering efforts, we are at once surprised and disappointed to find that it shows pretty nearly the same appearance as on commencing. And yet this should not be astonishing, for it is an artistically acknowledged fact that detail and effect are simultaneously unattainable, and this experience only bears further proof to the establishment of that point. At all events, it becomes at once evident that we must alter our mode of operation.

Now, taking it for granted that precedents are acknowledged as useful, I think that in caligraphy we find one from which a hint may be profitably borrowed for retouching, inasmuch that in our first writing exercises we are taught to aim at getting control of hand, regularity of letters, &c., which proceeding is attended with contortions of the body that would do honour to a harlequin, and the fact of our own necks again returning into their natural position forms one of nature's phenomena. Yet we rapidly surmount these difficulties, and eventually attain a fluency that seemed utterly impossible at the outset of our undertaking. And this, I believe, is the secret of acquiring the power of retouching. We must make the touch alone our study—our nightmare, in fact—until it becomes part of ourselves.

We can practise irrespective of a negative, and no opportunity is too short. The interval between ringing a bell and the door opening can be profitably utilized by "filling in" and otherwise ornamenting the door-check with our thumb-nails, in a manner never dreamed of by the grainer.

By making it thus our constant theme, we soon find it become "second nature;" and though, as in writing, we form a "hand" peculiar to ourselves, yet with the pencil, as with the pen, the beauty of that style is regulated principally by our own exertions.

Now we come to the second precedent. This I take from a sculptor or painter's method of working. They, of course, "rough out" or "lay in," in the first instance, and leave detail as an after-consideration. Let us follow their example, then, and instead of poring into the grain of the negative, nip at a reasonable distance from it, and first attack the *broad* inequalities, only occasionally closely observing our progress, and mere brief glances will show us the utility of having first acquired a reliable touch, for by the time we have subdued the large defects, we discover (contrary to our first wonderment) that there remains little else to remove; only a few more judicious touches, and the negative is completed.

I do not mean to declare that there exists any magic in manipulating as I have described, or that it is as soon accomplished as written about. I consider that retouching is decidedly difficult, and that this is one of the simplest and most legitimate methods of accomplishing that task. And having acquired the conveyance, let us hope that the *art* itself may play, at least, some small part in our work; and even then there is yet room to further hope that more discretion will be used than is too often found at present.

I have frequently cartes shown to me (principally Continental, seldom English, I am happy to say) generally a vignetted picture, representing what Mr. W. Heighway aptly terms a "barber's block." On what we naturally presume to be the forehead there is invariably a prominence, evidently a "correct likeness" of Columbus's egg after his well known demonstration with it. There is also a number of smaller half-eggs distributed about the face with a regularity of interval and an air of justness which commands the esteem of all; while two long white insects, of a species as yet totally unknown to naturalists, appear to be crawling in a horizontal position over the eyebrows of the "block." It is evident, also, that their motion is attended with decidedly ticklish sensations, if we may judge from the greasy appearance of the face, which denotes the perspiration to be on the point of bursting forth from every pore. In fact, this surmising is justified by the presence of one huge drop that has already started forth and made its way with remarkable precision down the centre of the nose, on the end of which it is still reposing amid a blaze of light.

The owner of this abomination generally asks who you think it is of. Now, if you wish to please and gain his confidence, first make sure it is not his young lady, then trust to your luck, and boldly declare it a most truthful portrait of himself.

Don't feel nervous about returning this answer: you may be pretty certain of it being correct, as the picture is so unlike aught human that no one would think of retaining it save as a likeness of himself! "Man, know thyself," but don't let photographers teach thee.

Question number two, by your customer, is invariably, in a patronizing tone, "How is it that they manage these things so much better on the Continent than here?"

Seriously speaking, it is only at a moment like this, seeing the appreciation with which these disgraces are received, that I, in my humble way, despair of photography ever gaining recognition as the art that it undoubtedly is. No longer can we wonder at the amount of contempt displayed by many painters towards all connected with it.

There is a general as well as an individual cause in our art, to which we should all feel proud in adding our mite, even at the risk of a small pecuniary loss. Every photographer holds a large amount of control over the decisions of his patrons. Let him legitimately exercise it. Let him teach them that there exists an artistic beauty in the plainest face, which this grease and whitening process cannot supplant.

My father (one of the pioneers of photography) frequently asserts that nothing is wrong in moderation, and nothing right in extremes. I have seldom found this bold statement confuted, and certainly I do not consider that retouching should prove the exception.

PARIS CORRESPONDENCE.

BY D. WINSTANLEY, F.R.A.S.

Letter No. 2.

Railway travelling I detest. I once had six days and nights of it in the United States, and have never liked it since; hence my journey from Liverpool to Bristol was by the sea. The sail is by no means an unpleasant one, and the fare is extremely low—seventeen shillings first-class return—for a journey thirty-six hours in length each way. I left Liverpool on the 23rd of February, and, as happened three years before, was the only passenger by the boat, which left the Clarence half tide basin at two p.m. I was accompanied in Liverpool by an excellent friend, a literary man, who had made an engagement to go out to Constantinople as editor of the *Levant Herald*, and of whom I was taking leave. He came pretty nearly changing, by inadvertance, the place of his destination, for having retired below with me to drink my health, he lingered until the "spring" was dropped, and the *Sunlight* began moving from the basin wall. By an extraordinary effort of agility he was successful in gaining the wall again, and then commenced the (to me) ever interesting operations of manœuvring the vessel out of dock, my friend walking along the walls and holding a parting conversation with me in such snatches as circumstances would permit. At length, the basin being cleared, the *Sunlight* headed away westward at full speed, and, standing on the quarter-deck, I waved my adieus to my friend now leaning against a mooring post on the great north wall. As the distance between us rapidly increased, I signalled to him with the newspaper which I held, and he responded with a copy of his own, and when he had diminished to a speck, which winking would have lost, I swept my paper in a large circle round my head, and for a moment saw the speck ashore surrounded by a ring of brightness, and my friend was gone, probably for ever. Then followed the usual scene: a snorting tug-boat hauling some large ship out, and another straining at, perhaps, some larger one to get it in; a fleet of little dredgers; a hugh Atlantic liner, with yards clewed up, and gliding along without making visible any sufficient reason why she moved; then the trim lines of an Isle of Man boat, walking, as it were, over the tips of the waves with giant strides; here a light-ship, with skeleton ball on high, and there a bell beacon lazily lounging about from right to left, and solemnly pouring out its doleful sounds. Then came the darkness of the night, with light and chilling wind; a few stars struggling into sight amidst the heavy overhanging clouds; a red lamp beaming here, a green one fading there; and at half-past seven the gleam along the heaving waters from the lighthouse at Point Lynas on our port. Then came the little cabin with its cheerful stove, and its dim and swinging lamps making the darkness still more real; the attempt to read the paper, and the failure; the consolatory cigar, the "nester," and the deck; the steady pacing to and fro, the bobbing against things which, in the utter darkness, you had no chance to see; the nestling in some snug and sheltered corner; the unctuous sucking of the fragrant weed; the hud, hud, hud of the propeller; the whish, whish, from the rapid cut-water; and the plash, plash, from the "exhaust aport."

Then came, as the hour of ten approached, the majestic gleam from the towering light of Holyhead, then again the utter darkness and the increasing chilliness of night; the sudden amazement, on looking around, to find light issuing from various portions of the deck, as if the little steamer carried a freight of fire, and were bursting under the influence of her unusual load; the remembrance that there were glasses in the deck just in the positions from which the light was seen to stream, and the idea that in all probability there were lamps beneath.

Then came the whiskey (indifferent enough, heaven knows), and then the berth, and after that the sensation of being stifled with indecent haste, the opening of the port, the sudden inrush of cold air, the discovery that your legs were bare, and the sheets not two feet wide; the degradation of your over-coat to the condition and uses of a quilt; the sensation of drowsiness, visions of the loved ones left at home, a phantom table with its cloth of purest green, a lot of lights, glasses, friends.

Then the propeller puts on its best of manners, and does its hud, hud, hudding business as quietly as it can. The other thing (you forget its name) is evidently asleep for it is not to be heard at all. A bright and fairy panorama floats before you. It is not very obvious where it is, and the material is extremely filmy. The figures, though luminous, are vague, and, like "the lazy, pacing clouds" of summer, or the wonderful enchanters of the Arabian tales, they slowly melt from form to form, even as you gaze. Then, gradually waning dim, the picture fades away.

A heavy roll of the vessel brings your shins in contact with the metal of the port. The daylight streams in gaily from the cloud besprinkled portals of the lurid east, the cool refreshing air of morning fans your brow, the propeller resumes its "hudding," the exhaust its "plash," and you are awake again, and ready for the business of the day. Your ablutions are staggeringly performed, much of the water failing to reach its proper destination, and you have a tendency unwittingly to take a seat upon the floor. At length you are safely "through," and proceed to pace the deck. A slight mist hangs upon the surface of the sea, the heavy ground swell induces in your vessel a slow and stately roll, and the distant land looms cold and grey against the golden burnish of the sky. A few miles away upon your starboard beam another propeller is heading north, and dips her little flag in salutation as she goes by.

A little after eight you pass the "Bishops," and at nine, or thereabouts, you sail between the Scomer and the Shokham—two islands off the coast of Pembroke—and attempt to sketch their bold and rocky outlines as you pass. The sea is breaking high against their grey and jagged walls, and whirling its sprays amongst the circling tenants of their caves as they scream out their plaintive note upon the morning air. By ten you are ascending into Milford; and the steam-syren on the lofty headland brays out its loud and piercing blast to warn the distant mariner of the dangers of the rock-bound coast. You are astonished at the capacity of the "haven," and admire the beautiful variations of its scenery, making a mental note that with your camera you will be some day "on its track."

Basking in the now warm sunbeams you whiff the fragrant weed, and take an interest unaccountable in watching a hundred cases or so of bacon lowered into the lighter "hitched" aside. You watch the bustling Welshmen, and find a sort of careless pleasure in the babble of their cries. At length the lighter slips her rope, and your steamer heads away for the next fifteen miles, or thereabouts, closely hugging a fine and rocky shore. The sea-birds dive as you approach; and you hear the heavy howling of the waves as they break in upon the solitude of the numerous caves. Here and there the rocks stand out in tall and turf-capped columns, laved at their base by the ever-restless sea which surrounds them on all sides. They stand the lonely sentinels of an age gone by—the last succumbing fragments of a once beauteous piece of land, now disintegrated by the Atlantic storms, and distribute beneath the ocean's surface in fields of sand.

You make another mental note to be again "upon their track," and by the mystic process of your art to congeal upon your crystal sheet the majestic forms which rise before you—magnificent in their ruin, and grand in their decay.

As you enter the Bristol Channel, you encounter, perhaps, a fleet of sailing coasters, an ocean boat or two, and numerous smaller craft. You have again the usual scene of lightships and landmarks, and again the gloom of night. The funnel of your boat, only faintly visible, pours out its rolling murky cloud, which in the darkness seems to suddenly exhale. The tapering masts loom up seemingly to an infinity in height, and eventually lose themselves amidst the blackness of the sky.

Here again beams the bright red gleam of the "port" lamp of an invisible ship. It seems to float like an ignis-fatuus in the air, and throws its lurid glow upon a track of rippling waves. Finally, it is suddenly extinguished, and the pallid green of the "starboard" light timidly steals in sight, and slowly fades away as you increase your distance from the unseen ship before whose bows you crossed.

At length you reach the Avon at (say) ten o'clock at night, and mysteriously wend your way along its constricted and meandering course, now half fearful of a collision with some descending vessel, the lights of which are visible higher up the stream, and now half fearful of one with some seemingly reckless tug-boat steaming on savagely behind. By half-past eleven, or thereabouts, you reach the Bristol Lock, and before twelve are safely moored alongside the basin wall.

Three years ago it was my fortune to make the passage of the Avon by the light of day, and I can recommend it as an interesting piece of navigation, the scenery through which you pass being exceedingly agreeable, especially when the trees are well in leaf. There are numerous choice bits out of which a Payne Jennings, with his masterly handling of the camera, would produce some fine results. Mr. Jennings, I may say, is personally unknown to me, but, in my opinion, which the reader will take for what he thinks it worth, his landscape work stands quite alone. His composition, to my thinking, is often quite as good as if the trees and stones had been planted or arranged to his design, and at Killarney I have, with his prints in hand, looked out the points of sight he chose to find out how he achieved his wonderful results where many others had so lamentably failed.

Bristol is a somewhat quaint old town, with narrow streets and rather lofty buildings, but sadly wanting in that cleanliness which strikes every Parisian visitor with admiration. Photography there seems to be conducted up sundry frowsy passages, or at the tops of musty stairs. The show cases for the most part have an air of seedy melancholy, and contain examples neither rich nor rare. Clifton, the "swell" suburb of the place, has wide streets and open spaces, but is approached by a villainously steep roadway, ascending to something like 250 or 300 feet above the level of the river. Its shops are handsome, its buildings creditable, and its photography respectable. Its suspension bridge is very well worthy of a visit, as also are the rocks around, and one or two of its churches are by no means bad. But there is a disagreeable pretentiousness about the place, as if it were over-conscious of its third-rate merits, and were putting on a little "side."

Bristol did not enchant me much, nor keep me long. Arriving on the 24th, I left it on the 26th. The road to the station—the one for the Southern railway—is winding, noisy, and disgusting. The atmosphere is abominably polluted by clouds of smoke, and when the station is arrived at you are greeted by the sight of Brunel's hideous broad-gauge engines, and his still more hideous rolling stock, which were seemingly designed by him under the impression that economical utility necessitated optical repulsiveness.

Leaving Bristol by an evening train (eight o'clock, I think) Weymouth was reached at midnight, and in about twelve hours the steamer *Cygnus* had crossed the Channel, and arrived in St. Helier's Harbour. The *Cygnus* is a wretched "tub," harbouring the vilest smells, shipping an unconscionable amount of water, and affording sleeping "accommodation" for all her passengers of one sex in a single room.

The charge for crossing the Channel is, in my opinion, considerably too high. "Half sailor as I am," I could not stand the horrible effluvium resulting from the destructive distillation of animal rejectments of various kinds, and accordingly gave up myself to the "qualms" of a maritime novice for the night, and arrived at Jersey in a grim and flabby state.

The Channel Islands—geographically, at any rate—belong to France, and within the range of authentic history were a portion of the Norman coast. The never-ending rocks which peep in thousands above the ocean's surface at low tide, or loom majestically beyond the present limits of the waves, furnish abundant material on which the photographer's abilities may be worthily employed, as do also the long and winding avenues of trees which shade each country road. Though there are no eminences of moment in the islands, the valleys have a luxuriance and beauty quite their own, and are capable of far better artistic treatment than they would appear to have thus far received. I am not surprised that Sutton should have selected Jersey for his home, and St. Brelades, where he resided, is a charming and sequestered spot, where I should imagine any man of thoughtful taste might be well content to live, away from the bustle and turmoil of a noisy world. The numerous martello towers, each with its solitary cannon, add to the picturesque quaintness of the scene.

Photography in Jersey is carried on in but a languid style, and there is no commercial establishment devoted to it of more than a third or fourth-rate rank. Indeed, in St. Helier's—practically the only town—there appears to be no site where a first-class establishment could be expected to "take root." The quaint and narrow streets seem to forbid the establishment of a first-class house, and, indeed, the whole aspect of Jersey is that of a place where the inhabitants are "dreaming the happy hours away," rather than mingling in the "struggle for existence" which is so keenly felt at "home."

The climate of the Channel Islands is somewhat damp, and accordingly relaxing. It is, however, warm and genial, and, if my own experiences are anything to go by, the island is an excellent place wherein to rest the mind, or dream away one's days in solving the problems of philosophy.

On the 9th of March I left Jersey by the steamer *Cæsarea*, at six a.m., and after a sail of two hours, or thereabouts, reached Granville, on the coast of France, in time to see the fleet of whalers starting for Newfoundland. The morning was bright and sunny, the white canvas of the score or two of barks flapped in the gentle breeze, and the songs of the mariners, as they hauled away the various ropes, floated merrily over the bright blue waters, as did the cheers of their thousand friends ashore, who crowded the wharfs of Granville, waving their adieus to those departing o'er the sea.

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Correspondence.

FERROUS-OXALATE DEVELOPER.

Sir,—Many photographers will be trying this new and simple developer, and any remarks even on what has resulted from failures may therefore prove acceptable.

My first trials were with Swan's new plates, which for rapidity, cleanliness, freedom from spots or stains, and ease of manipulation, leave little to be desired, and to the inexperienced amateur must prove a great boon.

But the instructions given are, I think, inclined to mislead. I prepared according to them a pint of solution, and my first developed negative gave me a very good opinion of the developer; the advantage, however, of occasionally moving the bath was made apparent by the sky being thin, owing, doubtless, to that part having exhausted the power of the solution in its immediate vicinity. The next negative, left in the developer for fifteen minutes, hardly showed a trace of an image, but after rather more than an hour a weak picture resulted. This I put down to under-exposure; but my next plate, which I purposely gave a full exposure to, refused to show any trace of an image after one hour's immersion. I took it out and placed it in the sun's rays, and again in the developer; after another hour, still the same plate as it came from the slide. I thought I must by some blunder have not exposed the plate at all.

The next trial, no formation of an image after two hours' immersion. I then added (not even filtering, as I expected no further result) a pinch of the ferrous salt, and left the plate in the solution for a couple of hours—in fact, forgot it. My astonishment was great at finding an excellent negative as the result.

From these failures I gather that it is best only to mix enough solution for the day's use, as it loses all its developing powers in a very short time, or to revive it with an occasional pinch of the oxalate of iron, this being contrary to what I had learned on the subject.

Walter B. Woodbury.

Manor House, South Norwood, June 24th.

RED DEPOSIT ON NEGATIVES.

Sir,—The subject of red deposit is, at the present season, one of considerable interest to photographers generally, and having myself suffered from it rather severely during the last few days, I venture to beg the favour of your inserting this, in the hope that some photographers (especially those who have worked in hot climates) may give us a practically useful suggestion for the abolition of this chemical scourge. I may mention that I have carefully tried the following, and found little or no benefit following thier use. Before intensifying I have applied a weak solution of sulphuret of potash; also the following solution:—

Iodine	1 grain
Iod. potassium	2 grains
Water	1 ounce

which is sometimes beneficial, but by no means infallible. Of course plates are always washed *thoroughly* between each application.—I am, sir, yours obediently,

44, *Regent Street.* F. R. Elwell.

[We shall probably have a few words on the subject shortly.—Ed.]

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Proceedings of Societies.

Edinburgh Photographic Society.

An out-door meeting of this Society was held on Tuesday, the 18th inst., the scene of operations being the Bridge of Earn, Forgandenny, and the beautiful grounds belonging to Sir Thomas Moncrieff.

The distance being considerable, an early start was necessary, and this, combined with the fact that rain had fallen during the whole of the night, made the muster at 6·30 somewhat smaller than usual. Enthusiastic photographers are not, however, easily daunted, and the select few had their reward in a cessation of the rain and a clearing of the atmosphere by the time the boat at Granton was reached. The half-hour occupied in crossing the ferry is generally a pleasant break in the railway journey, and it enabled the party to stretch their legs and compare notes as to processes, &c., and to encourage each other in hoping for a fine day. Taking the train again at Burntisland, they enjoyed the beautiful ride which, for a considerable distance, skirts the Firth of Forth, and then turns inland to Ladybank. From Ladybank the branch line to Perth strikes off, and runs through some of the most beautiful and fertile parts of "the kingdom of Fife," affording glimpses of the Tay, and a distant view of the recently-completed Tay Bridge. Nature at this time is probably looking her very best—the various shades of green being relieved by the charming show of wild flowers, and especially the red and white hawthorn now in full bloom; but without doubt the most gorgeous sight during the journey was a stretch of golden broom (*cytisus scoparius*) which clothed the embankment for nearly a mile, and appeared to the eye like a rapidly-passing band or belt of the purest and most magnificent yellow that can be conceived.

Bridge of Earn was reached a little before nine o'clock, and within a few minutes thereafter the members were doing full justice to a most excellent breakfast in the "Moncrieff Arms."

By the time breakfast was finished the weather had assumed a settled aspect, the light being good, although the sun was veiled, and not a breath of wind to stir even a silver birch. Eager to be "up and at it," the party soon found their way to the old bridge immediately behind the hotel, and in a few minutes all the tripods were set up and cameras placed in position, and their owners busy in the practice of the prospecting art, each looking here and there and everywhere, anxious to secure the best effects, and sanguine of his ability to select the points from which they could be got. We do not know if it has been generally noticed, but in such gatherings we have always found that in beginning to select the best points of sight, almost every operator had a notion of his own, and was loud in his praise of the advantages of the place he had selected; but in a few minutes other influences come into play, the result being that after many shiftings and much looking on this side and on that, the whole of the cameras are placed as near as possible together, the difference between the resulting pictures being only equal to the differences in the foci of the lenses used. This method has doubtless some advantages, but it is certainly not to be commended. There are few objects or landscapes that may not be photographed almost equally well from several points of view, and if that were more generally remembered by such gatherings, each member would have not only a picture from his favourite spot, but also, by exchange, as many as there were members present at the meeting.

The old bridge of Earn, at one time a portion of the main road from Perth to the north, has been long ago superseded by a fine modern structure. We have no information regarding its age, but it has all the quaint beauty and narrow inconvenience of most of the so-called Roman bridges. Originally consisting of five arches, only two now remain, and so long has it been in that state that the fractured side is completely and most picturesquely covered with ivy, some of the stems of which are three inches in diameter. The two arches are architectually alike, but different in size, and the beauty of the whole, and the facility for making pictures, are much enhanced by an erection—itself now in ruins—of a wall across the centre to stop traffic, and the ruins of a cottage which stand at the north entrance. Underneath those two arches, and far in front, over the space formerly covered by the other three, runs the river Earn in a quiet smooth stream, with the bridge and trees and all on the banks beautifully reflected on its bosom; and, to complete the picture, there are two or three boats, any or all of which may, without leave being asked, be made available to give life to the composition.

The best points of view having been chosen, and a number of plates exposed, it was agreed to proceed to Forgandenny, and return to the bridge for several views that could be taken with better effect later in the day.

The drive to Forgandenny was through a finely cultivated and richly wooded part of the country, and the rain of the previous night had given to it a freshness and beauty that made it delightful. Forgandenny is a sleepy little hamlet of a number of picturesque cottages, the thatched roofs of which have apparently not been disturbed for many years, and, consequently, are completely clothed with a rich vegetation, which includes many varieties of grasses and numerous wild flowers. The cottages seem all about the same age, and although one bears the date 1750, they are in a fairly good state of repair, and the occupants seem to vie with each other in striving as to who shall have the best kept and most showy flower plot in the cottage fronts. Here several fine pictures were exposed for, and then rain for a couple of hours put an end to work, a state of matters that was all the more disagreeable in consequence of the only hotel having been some time ago shut up. Temperance is undoubtedly good, and teetotalism tolerable, so long as its devotees practise toleration. But when thirsty photographers are compelled to "work dry" in a pouring rain, they are not likely to bless the memory of Father Mathew, or have much respect for the actions of his followers. Thanks to the village schoolmaster, the energetic teacher of an apparently prosperous school, the party got shelter in the schoolhouse till the rain ceased, and then several plates were exposed, and they drove as rapidly as possible back to the "Moncrieff Arms," and, in a liberal supply of bitter beer, forgot the disappointment of Forgandenny.

After luncheon, the members somewhat reluctantly, but at the earnest desire of Mr. Sinclair, drove to a lake, distant about half a mile from the hotel, and as it burst upon their view the scene provoked an outburst of genuine enthusiasm. The lake is over a quarter of a mile in length, somewhat serpentine in its windings, and wooded to the water's edge with a charming variety of exquisitely beautiful trees, some of the branches of which dip into the water, as if anxious to gather some of the beautiful lilies which abound in gorgeously beautiful clusters everywhere on the surface. It was at once agreed that the lake would afford scope for a whole day, or even several whole days' work, and a little sunshine was all that was required to give perfect pictures, and so it was reluctantly left with the understanding that an early outdoor meeting should be devoted to it.

Moncrieff house and grounds were next visited, but without anything specially attractive to the photographer being found. The house is a severely plain square building erected in 1679, but there are some magnificent trees, especially horse-chestnuts, said to be the largest in Britain. Only two plates were exposed here, and during exposure the party were conducted by Mr. Birret, the obliging gardener, through the garden and hot-houses, all of which were in perfect order and of great beauty. By this time the sun had again made his appearance, and a return was made to the old bridge to secure the subjects that had been left in the earlier part of the day. Here the remainder of the plates were exposed, and at five o'clock the intimation that dinner was on the table was received with gladness. We do not know whether the salmon and beef of the Bridge of Earn are better than those articles found elsewhere, or if Mrs. Ogilvy, of the "Moncrieff Arms," is blessed with a better cook than her neighbours, or whether the work of the day had put the members into a state of mind and appetite in which everything seemed more than usually excellent—probably it was a little of all three—but certainly each felt and ate as if never salmon or roast beef equal to that had been seen before.

Dinner over, an ordinary meeting of the Society was constituted, but the only business was the admission of new members, and Messrs. A. L. Dowie and Alex. Lindsay were unanimously elected.

This was followed by a few games of curling with polished discs of iron for stones, and a smooth table instead of ice, and at half-past seven the return journey was commenced. Edinburgh was reached at 9·45, everyone expressing himself highly pleased with the excursion.

The whole of the plates exposed were emulsion, one operator having gelatine, the rest collodion; and from all that we have heard, the success has been above the average. Perhaps our English readers will be surprised to hear that none of the exposures were under fifteen minutes, and most over half-an-hour. Our Edinburgh friends have always had a liking for long exposures, but they certainly manage to secure good pictures.

Talk in the Studio.

Highly Finished Enlargments.—We have been favoured by Mr. Alfred Harman, of Peckham, with a sight of some enlargements finished by his new patent process. The results are marvellously fine, and the means simple in the highest degree. We shall have more to say on the subject shortly.

Cloud Negatives.—We have been favoured also by Staff-Sergeant W. Perry, Photographer to the School of Musketry at Hythe, with some exceedingly fine examples of cloud negatives, admirably chosen and well photographed. They are on fine textureless trans-paper, and are in every way admirably well fitted for producing good work.

Recommending Too Much.—A correspondent of one of our American contemporary, in exstacy with Boissonas' "lightning process," says he has worked the process with complete success for a month, adding, "I purchased the first licence for the lightning process sold in this country; and I would advise each of the readers of this communication to do likewise." Now, how each of the readers is to purchase the first licence must become a perplexing problem.

Consumption of Silver.—Prof. Vogel, in an article in the last number of the *Deutsche Rundschau*, reckons the annual consumption of silver for photographic purposes as amounting to nine million marks (£450,000). One of the mines of the Nevada, such as the Big Bonanza, would more than suffice to supply this new drain of silver.

A Gold Toning Bath.—A Boston (U.S.) correspondent of the *Practical Photographer* says the following is an unusually valuable toning solution:—"Dissolve the gold in muriatic acid C P., with the least possible amount of C.P. nitric acid. Evaporate the solution to dryness over a water bath. Then redissolve in water, and to every 197 grains of gold used, add 74½ grains of potassic chloride. Again evaporate to the consistency of syrup, and allow it to crystallize, and use the same as chlo. gold and sodium, or the ordinary chlo. gold."

The Sun's Distance.—Mr. R. A. Proctor writes to the *Times* as follows:—"Yet another change has been made in the determination of the sun's distance from the measures made by the British observing parties. The first estimate of about 93,375,000 miles was diminished some time since, as your readers were informed, to about 92,800,000 miles,—a satisfactory approach towards the value (about 92 1-3d millions) which other measurements have shown to be approximately correct. We learn from the Greenwich report that the present estimate from the British observations is about 92,600,000 miles This result, unlike the result first published, is a satisfactory one. The photographic work ended in failure, the distances deduced from the best measurements being not far from 100,000,000 miles,—a result hopelessly incorrect. I would commend to the special attention of students of astronomy Professor Newcomb's discussion of his subject in the recently published 'Popular Astronomy,' a work in that respect and otherwise of great value. Albeit, I must warn your readers against the certain statements made by the critics respecting this work. Despite Professor Newcomb's acknowledged skill as a mathematician, the book is not, as they assert, absolutely free from mistakes. Strangely enough, such specially mathematical subjects as the tides and the precession of the equinoxes are among those which have been quite incorrectly dealt with. If this is not noted we shall have all the smaller popular astronomies repeating these imperfect explanations, the errors in which are by no means obvious, though really fundamental."

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To Correspondents.

John Terras.—Copper is the proper material for a still, and zinc or tin will not answer so well. 2 There are occasionally copies of the "Two Ways of Life" in the market, but very rarely. It is many years since the production and publication of copies ceased.

L. F.—The tinting of Daguerreotypes and collodion positives used to be effected by means of powder colours, which were sufficiently adhesive to stick to the surface when skilfully applied. Such pictures were of course always sent out under glass, and were so protected from injury to the powder colours. Such colours may be applied to paper prints, but the result is not so effective and vigorous as when oil or water colours are employed.

R. E.—Your mounted prints must be quite dry before burnishing. If there is any appearance of scratching, it is due to the burnishing surface being out of order, or to particles of dust being present.

G. G.—We believe that a properly fixed and washed silver print will, if kept properly, have a long tenure of existence without injury; but we cannot say that it would be permanent, inasmuch as silver is very susceptible to atmospheric influences, and readily tarnishes.

J. U. J.—The production of good enlargements on opal glass is dependant upon many points besides the developer. It is important to use a good ripe collodion, giving a clean, brilliant image. The best developer is one of pyrogallic acid: two grams to an ounce of water, and half a drachm of acetic acid. A good light is important, and carefully-timed exposure. If the exposure be rather short, a somewhat heavy, black picture is produced. If it be a full exposure, the image will be of a warmer tone. After fixing and washing, apply a solution of neutral chloride of gold, two grains to an ounce of water. This will give a black tone, and will clear up the image considerably.

G. L. M.—A thin, weak negative is better printed in a soft diffused light than in sunlight. In sunlight it will yield a flat grey image; but in a soft light a moderately brilliant image may probably be obtained. Printing under tissue paper, or through a sheet of yellowish or greenish glass, is often useful with a weak negative. The paper and bath may be modified to suit the class of negatives. For a weak negative a paper treated with a weak salting solution and moderately strong silver bath will yield the most brilliant prints. A dense negative is best printed in sunlight, and if the contrasts are still too great, and the image lacks harmony, blot off the free silver from the paper as soon as it is removed from the sensitizing bath. With very hard negatives, seriously lacking detail, expose the paper to light for a few moments before printing. This will materially aid in giving value to all the detail the negative possesses.

A. Green.—The selection of the point of view and mode of lighting are of vital importance in producing good landscapes. Educated artistic perception is an imperative qualification for success. You are in error in supposing that the lighting of a landscape is not under the control of the artist. It is true that he cannot control it by means of blinds and curtains; but it is not the less under control in the photograph. By selecting the time of day, the photographer can decide whether it shall be lighted from east, or west, or south. There are two modes of lighting, which, as a rule, are quite inadmissible either for landscape or building. It should not be lighted from the full front or back. If the camera were placed in front, and the light were behind the building, a dull flat uniform low tone would result. If the light were in full front, and the camera also in front, a flat blaze of light, without shade or relief of any kind, would be produced. As a rule, a slanting light is best, as this gives relief and light and shade. A good result is often produced if the landscape or building be taken whilst the sun is obscured by a slight cloud, and shine out for a moment before the exposure is finished. Experience will teach many points of importance which can only be gained by experience.

Anxious to Succeed.—It is undoubtedly good training for a photographer to master the manufacture of all the materials with which he works. But the home manufacture of collodion, chloride of gold, nitrate of silver, &c., has never prevailed much in this country, as it has amongst American photographers. Here it is possible to purchase everything ready for use of trustworthy quality and at moderate prices, and it has become the custom so to purchase. On the whole, we think that the same time and energy may be better applied to artistic culture than to the manufacture of chemicals, which may be purchased of good quality. The practical and artistic use of materials in producing good pictures is of more importance than the manufacture of chemical preparations, although we do not under-rate or discourage skill in this direction.

Intending Exhibitor.—Apply to the Secretary of the Photographic Society. We do not yet know who are the English jurors for photography in Paris.

O. E.—The tint of which you enclose sample is a very good one for the interior of the studio. 2. Yes, colour the end of the room for a background. The tint enclosed for the interior will answer well for a background for vignettes; and one considerably darker for ordinary portraiture. Get the painter to paint them in oil flatting.

Z. A. Z.—Nitric acid is not a good addition to a printing bath. Make the silver bath neutral by the addition of a little carbonate of soda. Give your prints one quick rinse before toning, instead of three washings. Use six ounces of water in the toning bath instead of ten ounces. Good soft water will answer well.

Skylight.—As a rule, we like a sitter placed about three feet from the background, but he may be placed nearer to or farther off as the artist may judge desirable. If it is desired to make the background dark, place the sitter a good distance from it, and *vice versa*. 2. Yes; twenty-four feet would be sufficient for a lens requiring twenty feet between camera and sitter, but it would be circumscribed work. 3. With a ridge-roof of from thirteen to fourteen feet, a side-light of from six to eight feet would answer well. 4. With a ridge-roof room running north and south we should glaze both sides, and shade with curtains when necessary. This would enable you to work both ends of the room, and enable you to work in all conditions of light. 5. The nearer the sitter is placed to glazed portion of studio the greater amount of light will reach him. As a rule, he is placed four or five feet from the sides. 6. The Klary screens are hand-screens. Mr. Cussons, of Southport, makes some good ones. 7. We do not know a model studio anywhere. Almost all studios have to be built in accordance with some existing exigencies rather than with theoretical considerations.

Lyddell Sawyer.—Many thanks. We thoroughly agree in the principles you enunciate. Thanks, also, for letter and remarks.

O. T. H.—Such a work as you desire will be issued shortly by Captain Abney.

Novice.—We should choose No. 1 or No. 8; but if you are not familiar with dry-plate work, it is scarcely wise to rely upon it on an important occasion.

A. E. Smith.—In our next.

The Photographic News, July 5, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

Travellers and Photography—Modern Chemical Investigations.

Travellers and Photography.—Mr. Stanley is not the first African traveller who has availed himself of the camera to take sketches by the way. Gerhardt Rohlfs, a German explorer, was accompanied on his last expedition through the Libyan desert by a photographer, whose interesting diary, it may be remembered, appeared in these columns a little while back. The name of the photographer was M. Remele, and his graphic account of difficulties undergone and combated made up a most entertaining narrative. The want of water furnished the main theme, and particular care was necessary on behalf of the leaders to see that the skins were properly filled. All sorts of tricks are resorted to by the natives to shirk work, and on one occasion, after the caravan had been a couple of days *en route*, it was found that the camels had been laden with dirty water from the nearest ditch, instead of sweet water from the wells. The consequence was, that the whole caravan had to return, for it dared not penetrate the desert with a bad supply of water, and thus a week was lost over the matter. The natives cared little whether the members of the expedition came to grief or no; all they wanted was to get money, and get it quickly. In fact, they turned out as great scamps in dishonest dealing as any to be found at home in our own metropolis. Another sore drawback was the vast amount of fine sand in the atmosphere, which blew in everywhere. Cameras, plate-boxes, and lens-cases, however well made, could not keep out this distressing annoyance, and the films of the negatives were much damaged by the particles. M. Remele not only secured photographs of buildings and localities to mark the passage of the caravan, but, moreover, secured a large series of portraits of natives in the various villages and hamlets where temporary halts were made. The monotonous, never-varying aspect of the sandy plains afforded little scope for the camera; sometimes, we are told, a long stretch of plain would be succeeded by low sand hills, but little other change was noted for days together. M. Remele's return to civilization was, perhaps, the most graphic incident of all. The caravan had been marching day after day over the hot plains, without a shrub or building to vary the monotony, and the traveller's eyes grew hot and red from searching the horizon in front. Men and animals were listless with heat and footsore with fatigue, some perched upon the camels to command a better look-out, as they strained their eyes to get early sight of the great river Nile, their destination. "Presently," said M. Remele, "we saw a little patch of black upon the horizon which the initiated at once appreciated. Along the caravan came cheers and expressions, and fresh energy and vivacity came to everybody. In a moment, there was laughing and chatting everywhere, and speculations entered into as to when they should arrive at their destination. For that black mark in the sky was smoke, and the smoke, they knew, came up from one of the vast sugar bakeries on the banks of the Nile. The black pillar of vapour that constituted their beacon was the first welcome back to civilization. Of course, Mr. Stanley's tour through the Dark Continent is a much greater undertaking than the one we have just alluded to, and it was a happy idea on his part to provide himself with a camera, since the photographs brought back help materially to confirm his report. The illustrations of the book just published by Messrs. Sampson Low and Co. are partly from photographs, and partly from sketches made on the spot, and we have no doubt, now that Rohlfs and Stanley have shown that photography can be employed upon these long journies, that future travellers of eminence will avail themselves of the important aid which a camera may lend. The Geographical Society, which occupies itself a good deal with the outfit of travellers, would do well to urge this method of securing records of travel upon those who journey under its auspices, for useful as photographs are under any circumstances, they are doubly so as records from untravelled or unknown regions. The provision of a portable camera and trustworthy dry plates will hereafter be a matter of importance among a traveller's *impedimenta*, and it will not be long before we shall expect to see books of travel illustrated by photo-mechanical prints. Travellers will have to mind how they tell strange stories, and if their exploits are not quite so wonderful as they used to be, they will, at any rate, bear the impress of unvarnished truth when supported by the evidence of sun pictures. It is surprising how much romance—to put it delicately—has been taken out of travellers' books by the camera. Look, for instance at a picture of the Gavarine Waterfall—said to be the highest in Europe—in any picture-book of the last century or beginning of this, and then look at a photograph of the same phenomenon. If the draughtsman has seized a favourable moment for depicting the Fall, so also has the photographer; and both, we may be sure, have made the most of it. But no intelligent man would ever believe the two pictures represented the same thing. In all probability the engraved picture was finished and elaborated miles away from the spot, while the photograph was completed in the cirque of Gavarine itself. The engraving may be as artistic and romantic and beautiful as you will, but it lies, nevertheless, and no more represents the real scene than do those fanciful act drops at the theatre represent scenes from real life. If our books on African travel, then, are provided with sketches as true to nature, it is surely high time that photography should be called in as an assistant to the traveller, and as a sort of second conscience, to prompt him to stick to the truth, when his romancing pen should think of leading him astray.

Modern Chemical Investigations.—The endowment of research, upon which a good many worthy gentlemen have expended a good deal of sympathetic argument, is a matter upon which opinions are divided. Some think much good may be done by encouraging young and ardent philosophers to undertake investigations; and in this they cannot be far wrong. The only question is whether the funds, when they come to be expended, really do reach the right man, and whether it is really productive of the good that is intended. So far as we have seen, it is not so much the hard workers as those who have interest with the distributors who benefit. Nor does the money, of which a large amount has already been expended, seem to bear much fruit. A man because he receives a hundred pounds is not in a better position to discover or invent than he was before, and if he has made a successful investigation he will be certain to make it known, whether he gets the money or no. The Chemical Society spends a large sum of its funds in the publication of records of recent researches, and, to judge from some of the papers, young chemists seem to be attacking all sorts of problems. We do not know if endowment of research is responsible for some of these strange investigations, or the desire to appear in print. The public supplies much of the money, and the public ought, therefore, to have the result of the researches placed before them; at the same time we think the Chemical Society should show some discretion in respect to the character of the investigations published, otherwise they will teach the outside public too much. We will quote two investigations to show what we mean. One is on the "Substitution of Chlorophyll for Copper Salts in the Preservation of Fruits and Green Vegetables." Could there be a more praiseworthy subject of investigation by a chemist? The latter tells us that copper is noxious when added to pickles or preserves, and suggests a more harmless and equally effective colouring matter in the shape of chlorophyll, a green colour obtained from parsley or other similar vegetable, with a solution of caustic soda. It is further treated with alum, &c., and then added to the pickles. For our own part, we should prefer the preserves being left alone, and consider them outside the domain of chemical research; but this, we suppose, is past praying for. We suppose in future pickles will be labelled "Copper" or "Chloro," so that customers may choose which they please. The other instance of chemical research is upon the "Preparation of Artificial Champagne." The Chemical Society, in presenting this to their readers, does not give an opinion on the wine, but confines itself simply to the recipe. We shall not tell more than remark that "petroleum" is not the stock employed, nor shall we give the secret of manufacture, since the majority of our readers are not Fellows of the Chemical Society, and do not, therefore, subscribe to the funds for the advancement of chemical research; they are consequently not entitled to the benefit of the scientific knowledge here conveyed; but to show we are in earnest, we quote the last sentence:—"Sometimes the wine is not sufficiently crêmant; this can be remedied by the addition of gum arabic and more glycerine."

LIGHT AND SKYLIGHT.

BY H. M. BEELES.[*]

If we consider light as coming from the sun or from a lamp, it will be sufficiently accurate to treat it as coming from a single point, from which the light diverges in every direction. With the skylight, which is the source of light to the operating room, in just the same sense as the sun is to the universe, or the lamp to a room when darkness would otherwise reign, it is different, for from this every point in the surface is capable of radiating light, or more philosophically speaking, of transmitting light in every direction; hence the consideration of laws which govern light in the studio are very different from those which govern light direct from the sun or a lamp. Natural philosophy deals very fully with those laws, and it is an absolute requisite that the true artist should fully understand that subject, else it will be quite impossible to understand the more occult laws which obtain under the skylight. I will not pretend to say that the artist must necessarily understand all the technical or scientific terms, nor indeed the working of the laws themselves, but I do say that unless the principles be understood which underlie the laws the operator will for ever be groping in the dark, sometimes by accident producing a good result, but far oftener failing totally to accomplish what he desires. If his work be critically examined, here will be found a false light, there the light has been poured on in a perfect flood, here the shadows are badly broken up instead of being softened, there the shadow is so dense that all detail is lost; and yet he does not know why.

Hence, I say, if you would be an artist, you must understand the principles of light; and before you can understand the complex laws which govern your working light, you must understand the more simple ones laid down in the optical department of natural philosophy. If you do not fully understand them, dig out your old books and study; if you have not the old ones, buy new ones, and go to work with a will. It is a short and interesting job, if you are in earnest. In every operating room there is a point where the light is the strongest, and as you go from this point it everywhere grows weaker. It does not weaken as you go from this point uniformly, but in a sort of ellipse, the greater axis of which will be found to lie nearly in the direction of the longest way of the skylight, the point of strongest light being in that end of the ellipse which is nearest the lower end of the light. The light from this point weakens in every direction outward and upward, so that at every point, back or front of the skylight, will be less highly illuminated, the higher you go up the background, and the nearer you bring the background under the skylight, the less will be the difference, until when it is brought close to one side of the light no difference will be observed; if brought under one side, the top will be the most highly illuminated. which is due to another law which will be brought out in its proper place. This point of strongest light is always changing, due to the fact that the constant revolution of the earth is ever changing the direction of the light as it falls on the skylight from without, and so is transmitted to within the studio. In the forenoon it is west, at noon just beneath, and in the afternoon it is east of the skylight. 1st law: The strongest point of light in the studio is in the northern focus of an ellipse which lies in the direction of the skylight, and is in proportion to the length and breadth of the skylight.

It is a well-known fact that light decreases in intensity according to the square of the distance from its source, *i. e.*, for example, a ray from the sun or from a lamp; but here we find a complex question, as investigation will prove; for instead of a single ray, we find every possible point in the entire surface sending out rays in every direction embraced in a semicircle beneath the surface of the skylight, and while these cross each other at every point, or fall in parallel rays as the case may be, or diverge at every possible angle, they serve to render the subject as difficult of elucidation as any we are called upon to discuss.

A diagram drawn with the supposition that the sun is at meridian, so as to show the direction of all the rays of light which enter the studio through the skylight, would show a portion of space beneath the skylight very highly illuminated, and from thence diminishing in every direction until the most remote corner of the room is reached. As the rays fall from the light above, the full volume (practically speaking) falls downward, minus the rays which are sent off at the various angles of divergence outside the space directly beneath the skylight. The aggregate of all the rays which fall outside the space beneath the skylight will be subject to the general rule, and will decrease in intensity according to the square of distance from the skylight. Thus if the light at 2 feet from the skylight be represented by ¼, at 4 feet it will be represented by 1-16 in any given direction, but a veriable algebraic symbol would still be required to express the intensity of the light, since at every point upward fewer diverging rays are sent off. Hence the 2nd law: At every point receding from, and at every point upward from the strongest point of light, the illumination becomes less.

An apparent exception, as before intimated, will be found when the background is moved forward until it stands at any point directly beneath the skylight. This is due to the fact that the general law now applies—to-wit, 3rd. law: Light decreases in intensity according to the square of the distance from its source. This law depends on a mathematical law for its demonstration as follows:—Circles are to each other as the square of their diameters. Now, since every ray of light is represented by a cone, the vertex of which is at the source of light, it follows that every plane which is passed through the ray at right angles to its axis will be bounded by a circle, and as each plane is bounded by the sides of the same cone, the diameters will be to each other as the distance each is from the source of light. Hence the law.

Again, the subject is complicated by reflection and refraction, and again by diffusion. The law of reflection needs to be well understood, but I have not space to explain further than to state the law, which is as follows—4th law: The angle of incidence is equal to the angle of accidence, and to say that accidence is the direction at which the light meets a reflector, and incidence is the angle at which it is thrown off again. It is very necessary to fully understand this subject, since it is just here that so many operators may be justly criticised, as before stated.

I trust you will not deem me egotistical when I say that a large percentage of faults come from the bad handling of reflectors. Nor will I say but that I have had faults to correct on this line; nevertheless, to properly correct a fault two things are necessary; 1st, to appreciate the fault; 2nd, to know how to apply a remedy; therefore study the subject well; it will pay. With refraction I will not trouble you, as it ranks with the least of evils, and if it be one at all, it would certainly be beyond your power to rectify it.

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[*] *St. Louis Practical Photographer.*

Diffusion of light, although of the utmost importance, can engage but a small portion of attention in this article, because to fully discuss it would require a small volume. As commonly understood, it may be divided into two subjects: 1st, natural diffusion; 2nd, artificial diffusion.

The atmosphere, everywhere and at all times, is filled with more or less floating particles of matter, and all of these are more or less opaque. Those which are opaque reflect a portion of light and absorb a portion. Those that are transparent refract a portion of the light, and absorb a portion. This constant changing of the direction of the rays until they are thrown in every conceivable direction is known as diffusion. This is natural diffusion. When any translucent screen is made to intercept the direct rays of light, and the atoms of which the screen is composed reflect or refract the rays, so that those which come through have lost their general direction, some passing one way and some another, they are said to be diffused. This is artificial diffusion, and it at once becomes apparent that diffusion is the result of reflection and refraction by minute bodies. Natural diffusion is one of our best friends, as it comes unbidden, lends a helping hand just when we want it, softens down shadows, brings out detail, and produces all the delicate gradations in the image. We cannot control it, we cannot produce it, neither can we change its proportion to the volume of light. We can only take it and use it as we find it, and a gracious God has given it in just the proper proportion.

With artificial diffusion we have all to do. By it we may soften high lights, break up too strong contrasts, and give proper modulation and solidity to the image.

The means employed are curtains, screens, ground glass, and blue frosting; of these, for various reasons, curtains and screens do and ever must stand pre-eminently in the foreground, both on account of cheapness and the facility with which they may be used. Among the best contrivances for diffusing the light about the head may be mentioned Kent's hand screen and Bird's head screen. Where a more general diffusion is required, or a bad reflection is to be cut off, movable screens set in a frame-work, so that the screen can be adjusted at any angle, are very convenient. The frame-work may be mounted on castors, and should be quite light. Sometimes several will be found to be very convenient, and some may be made double, that is, in sections one above the other, so that they may be adjusted at different angles; and if made of white muslin, they will answer the purpose of either a screen or reflector.

Curtains need no description, for all operators have used them, though with not equally good results.

Absorption of light is the principle by which any object appropriates to itself a portion of the ray of light, and thus renders it apparent to us by sending off only the rays of its own colour. This, again, is a great advantage to the artist, as by this principle he is able to cut off all bad reflections from the walls of the studio simply by using a neutral tint as a paint or kalsomine, such as a drab, with just a shade of burnt umber added.

I should have said that in the case of diffusion of light, there is less of this quality the weaker the light is.

If all the above has been thoroughly understood, you will find but little trouble in determining where to place your sitter, as it is certain there is a best place for a sitter every time; and it is also true that that place is constantly changing, and that a tall person cannot occupy the same place as a short one, because the lighting suitable for a short person would not do for a taller one, a standing figure could not be placed in the same relative position as a bust, &c.

You should take into consideration the angle of light from the same, to determine where the point of greatest light will be, and then place your sitter so that the light will fall on the face at an angle of about 45°, moving the subject east or west until the proper brilliancy is obtained. If the drapery is well lighted and the face is in shadow, move the figure forward; if the model appears flat, move it back; if there is not enough contrast, bring the figure nearer the north side of the light, and turn the face from it more or less until the proper effect is obtained. If the contrasts are too strong, pursue the opposite course; and, above all, know each time why you do anything.

Be sure you place your reflector so it will not cast a light into the eye in such a manner as to cut one-half of the iris out entirely. Study your angles carefully every time you use your reflector.

In considering the above subject you will observe that no allusion has been made to a side light. I have made none because it would very much complicate the subject, as light would then enter from two general directions instead of one, and because I would prefer to so construct a skylight that no side light would be necessary. To construct a light so that all the illuminating power shall come in one general direction, the lower end should be from four and a-half to five feet, and the upper end fourteen to seventeen feet, from the floor. It should have an angle of from 50° to 60°, and have a proportion as twelve is to twenty feet, bearing in mind that the lower the light is, the smaller it should be. The steep angle given is such as will avoid direct sunlight most of the year, and this is no small consideration. It is very desirable that your room should be so constructed that you can work all around it, and to do uniformly good work at all reasonable times, it is absolutely necessary. In constructing your light, do not let the glass lap more than one-half inch.

In the above article only northern latitudes have been considered. South of the equator, where south light must be used, south would stand in the place of north, and *vice versa*.

EXPRESSION IN PORTRAITURE.

AN article in the *Mittheilungen* has some interesting remarks on the action of the facial muscles in producing different expressions, which will suggest to photographers—especially those engaged in retouching—the importance of studying artistic anatomy. The writer says:—

In treating of the countenance and of the physiognomy, it is generally stated, concerning the horizontal wrinkles of the forehead and the drawing up of the eyebrows, that these add to the expression of attention, and of surprise or of happiness. This gives proof how incorrect it is, for such a motion of the muscles of the countenance to form an isolated expression, when it, by combination with the motions of the other parts of the countenance, will form an entirely different and opposite physiognomical appearance. Press out the horizontal wrinkles and raise the eyebrows. Certainly attention and astonishment will be expressed when the eyes are wide open; but, on the other hand, if the upper eyelid is but partially raised, there is formed by this single action a completely opposite expression of lassitude and sleepiness. But this expression may be seen even without the actual presence of sleepiness, or lassitude, constantly in all cases, in which that muscle which raises the upper eyelid becomes too weak, or when, which amounts to the same thing, through the lengthening of the lid, the weight has become too heavy for it. In such cases the effect on the physiognomy is even much stronger than by the natural action. The last, when it has become so frequent or accustomed, yet can exercise a mechanical effect on the skin not so strong as that constant contraction, which, without forming anything of a facial action, acts as an aid to the weak muscle. Hence, such wrinkles must naturally be represented as essential, not as accidental. This applies also to the vertical wrinkles of the forehead. These are formed by the contraction in the lower part of the forehead, towards the middle, of the muscles distributed above the eyebrows, acting in a horizontal direction. The eyebrows are drawn towards each other, and form thereby in the middle of the forehead, directly over the root of the nose, one or more vertical wrinkles; when much contracted, a short row of them, or even perpendicular wrinkles over the inner halves of the eyebrows. This forms an expression of earnestness, mental strain, deep thought, or anger. Continued mental strain, existing on some individual cause generally, leaves remaining behind it perpendicular lines and wrinkles, as are to be seen, for example, on the heads of Bishop of Fresole (Naino) of the fifteenth century. Only very rarely do we find remaining on the forehead that form of wrinkles which are formed by the simultaneous contraction of all the muscles, and which produces an expression of deepest pain. By this forming of wrinkles the eyebrows are drawn very near to each other, and at the same time bowed upward, as is so beautifully represented in the Laocoon. As this remaining facial expression is one, as has been said, of such wrinkling of the forehead, and placing of the eyebrows, it is hardly to be considered in the portrait.

A constant wrinkle is formed more sharp in the aged, on both sides of the mouth running down from the sides of the nose. On the cheeks and under the chin parallel wrinkles come, as, for instance, on the head of Benedette di Magauo, first in latter age, but also then hardly strongly marked. On the other hand, much more freely the numerous fine wrinkles, on those places of the countenance where they are the thinnest—that is to say, on the upper eyelid, and on the lower even to the edges of the hollow of the eye. Here the changes on the quantity of the flesh under the skin shows itself so sharply that even in different parts of the day a change in the general condition of the health shows itself distinctly. The knowledge of the formation of the wrinkles in these parts of the skin has on the appearance of the countenance a great influence.

The veins are of great importance to the painter, in so much as the colour of the skin in various parts of the face depends on them. For the sculptor, on the other hand, the single great veins come most particularly under consideration, which in men in later life show themselves on the forehead, temples, and neck, strongly enough to mark their form on the surface.

While on the body, for example, on the extremities, the muscles, in an uncontracted position, make themselves seen, the muscles of the face are not visible; first, because they are so thin; secondly, because they are covered with such a relatively thick layer of flesh, and are revealed only in their action, and the motion of the covering mass. By the strong contraction of these muscles will all the motions of the countenance be produced which are necessary for the various expressions of agitation and passion. These lie without our region, however, as anything of a very agitated expression, lasting but a short time, clearly may not be represented in a portrait. The little waverings in the amount of tension of the above-mentioned muscles, however, are of great weight in a portrait. They define each delicate change of form in the eye, lip, and cheek, wherein the closest observation is of the greatest importance to the painter, and will protect him, and especially the sculptor, from the danger of giving to the countenance composed in rest, and which should have the peculiar characteristics to make it a portrait, stiffness, lifelessness, and expressionlessness.

The proportions of the mouth and eyes are similar, as one will see on the slightest thought. One must particularly impress himself with the fact that that which is called the expression of the eye depends only in the least part on the eye itself; that is to say, on the pupil, the far greater on the bearing of the surrounding parts, that is, the eyelids. The movement and change of form of the eyelid are brought about in an analogous way to those of the mouth, to the contraction of a circular muscle, the orbicularis palpebrarum, and the opposing muscles mainly, one especially, lying below the surface, covered by the orbicularis, the muscle to raise the upper lid, and another to move the skin and eyebrows.

In the same way as the circular muscle of the mouth, that of the eyelid can contract completely, or in a single part, or in one part more than another, and this with more or less resistance from the opposing muscles. The effect, which depends on the position of the lids, and the form of the space between the lids, is of course not so extensive nor so varied as the effect of the very complicated arrangement of the cheek and lip muscles on the form of the mouth. Yet the effect on the form of the eye is much greater when the least alteration in the edges of the lids produces a very noticeable effect on the appearance of the pupil.

To find the effects we must cut off all the least influence on the eye, by covering all the other parts of the countenance, and by complete immobility of the eye, the pupil looking directly outwards, study the influence of the least change in the lids on the appearance of the eye. We will see then that the upper lid moves up and down as a curtain upon the eye, not in one plane, but clinging completely to the surface of the eye. This lid connecting at the corner of the eye with the lower lid, not so movable, but also moving up and down, always covers by far the larger part of the pupil, and leaves visible only a part, approaching oval in shape.

This part only is it which we, from an æsthetic point, are accustomed to represent as the eye, and the size and form are the apparent size and form of the eye. I say apparent, for there are in reality no changes in the size and shape of an eye. When we are accustomed to speak of a large or small eye, we mean only the apparent size, which depends on the size of the space between the lids and the amount that the socket is hidden. The true size of the eye is changed only by a fixed abnormal condition—for example, by very great shortsightedness—and in all other cases, in apparent changes, always is the same.

It should not be said, then, that the pupil has no effect on the expression, but only its surroundings produce the effect. We should add to the before made experiments in which the lids moved and the eyes remain still, others when the lids and eyebrows should be supposed to be at rest whilst the pupil moves in its centre from right to left. When the pupil thus moves within the space between the lids from one end to the other, and changes thereby the expression by one eye, how much more will the change appear when both eyes are noticed at the same time, and still more when it will not only horizontally but perpendicularly, and when, necessarily, a change in the form of the lids is added. These changes form what is called the glance.

Of the direction of this glance painters have entirely different ideas in their compositions as well as in their portraits. It is a surprise to me that many of the old masters have a particular love for one fixed direction of the glance; thus, Murillo loved to represent the glorified look straight up, while Guido Reni the obliquely upward and sideways drawn pupil; and these directions in one of the Laocoon or in Niobe give the method of holding the head and the position of the eyelids and eyebrows a particular character. Van Dyke drew a peculiar and almost completely uniform direction of the glance in his numberless portraits. They look somewhat to one side of the person viewing them, and into the distance—so much so, that in the heads which are turned to the right the eyes are turned so far to the left, and in the heads that are turned to the left the eyes are turned so far to the right, that the iris lies almost in the corner of the space between the lids.

More difficult is the representation of the glance for the sculptor. All colours fail here (at least in our day), by which through the representing of the pupil, and the surrounding iris, the position of the eye is easily shown. Yet one recognizes in the ideal compositions of the classic ancients, accidentally, the direction of the glance from the position of the eyelids and the placing of the pupil.

The value of anatomic and physiological knowledge will frequently be felt. The advantageous influence of a well-grounded knowledge of anatomy and of true physiognomy will be of value for every part of a portrait. The realistic will thereby be protected from the least accidental imitation. In study for the expression of characteristic and physiognomic movement he will learn to improve his work through this intellectual activity, and to turn himself to true ideality.

◆

NEGATIVES ON PAPER.*

In the bulletin of the Belgian Photographic Association there is a communication by M. Laoureux on the employment of paper instead of glass in the dry plate processes. Paper or cardboard is waxed in the ordinary manner, and is next rubbed over with talc, when it is ready for collodionizing. To do this, alcohol is floated over a sheet of glass rather larger than the paper, and the paper is placed on the glass, and after covering it with blotting paper a soft roller is passed over the surface to expel the excess of alcohol. (We may remark that an ordinary wooden roller covered with felt will answer the purpose. Or if a sheet of paper, also waxed, be placed over the blotting paper, the ordinary squeegee may be employed). The collodion is applied, and the remaining operations are proceeded with as usual. After the preservative has been used, the paper is suspended by one corner to dry. Too thick cardboard should not be used, as it is apt to warp in drying. This paper it placed in the dark slide behind a glass plate and then exposed. The development is conducted in the usual way, by replacing the paper on a glass plate, or by using a developing dish.

The writer remarks that this negative if printed would show the grain of the paper; so in order to avoid this, the film is detached after being gelatinized. The gelatine solution is prepared as follows:—

Gelatine	20 parts
Water...	100 „
Glycerine	2 to 4 parts, according to its concentration.

The gelatine is first allowed to swell in part of the water, and the remainder added boiling, or by heating over a water bath. The glycerine is added last, and the solution is then filtered.

This solution is poured on the film at a temperature of from 85 to 95° Fahrenheit, and is allowed to dry. The film is then readily detached, and the author says that he never meets with a failure.

This process answers well, no doubt, but we should feel inclined, after getting the negative, to adopt Woodbury's plan of utilising the film for printing, viz., to coat a plate with gelatine to which a little chrome alum has been applied, and then to bring the film in contact with it. In this operation the gelatine is allowed to dry, and is then immersed in hot water, and when still tacky the film is brought in contact with it by means of the squeegee, a film of water being between it and the plate. This gives a very compact way of carrying a sensitive surface in the field, and is capable of being utilised by any one.

We recommend a washed emulsion as being the most suitable sensitive compound to use.

◆

PRODUCTION OF COLD.†

When matter passes from the solid into the liquid state, heat in large quantity disappears, and a depression of temperature is produced. The chemist avails himself of this fact that heat disappears during liquefaction, for the purpose of producing artificial cold. This is accomplished by means of freezing mixtures formed by the liquefaction of substances in water or some other fluid. The absorption of heat by the freezing mixture produces a depression in temperature varying in proportion according to the nature of the substance employed. The heat thus transferred or absorbed is termed "the latent heat of solution of a salt." Ice and salt, when mixed together, produce a temperature of 6° owing to the rapid melting of the ice and the subsequent solution of the salt in the cold water.

Freezing mixtures are useful to the chemist for determining the congealing point of fluid substances; and for this purpose they must surround the vessel containing the substance to be acted upon. When the two have remained in contact long enough to produce the desired effect, the temperature of the fluid under examination must be noted with a thermometer at the instant of transition. In order to observe the result properly, a thermometer should be placed in the liquid at the commencement of the experiment. Another thermometer must be plunged into the freezing mixture to assure that the two liquids are of uniform temperature.

Freezing mixtures afford the facility of making ice at all seasons and under all circumstances. When but small operations are required, the vessels to be cooled may be refrigerated by keeping their surfaces moistened with ether, which, volatilizing rapidly, abstracts and carries off a large amount of heat. Rapid evaporation is, indeed, always the means of producing intense cold. This fact is made use of in warm climates, where water is exposed in earthen vessels, which are suspended in the room, and by the means of rapid evaporation are rendered cool and refreshing. Ice is also formed by the simple evaporation of water. Large, shallow earthen vessels resting upon imperfect conducting substances are exposed to the air over night, and by means of rapid evaporation a thin film of ice is formed. If a glass bottle containing water be covered with a cloth which is kept constantly wet by the application of water, the evaporation from the wet cloth will soon diminish the temperature of the vessel, and if the cloth were moistened with alcohol or ether the decrease in temperature would be proportionately greater. Wine and water coolers composed of porous ware act in the same manner as the cloth. On the ancient monuments of Egypt, a man is sometimes represented as fanning a huge earthen vessel or cooler with a palm leaf to promote evaporation, and the Arabs still practise this custom.

In preparing freezing mixtures, the substances composing them should be previously well pulverized, and then mixed thoroughly together without unnecessary delay.

The following table presents formulæ for a variety of freezing mixtures:

1.—Freezing Mixtures

Composed of ice in combination with chemicals.

Mixture.	Temperature produced.
Snow or pounded ice, 2 parts, Muriate of soda, 1 part,	... ... 5°
Snow or pounded ice, 5 parts, Muriate of soda, 2 parts, Muriate of ammonia, 1 part,	... ... 12°
Snow or pounded ice, 24 parts, Muriate of soda, 10 parts, Muriate of ammonia, 5 parts, Nitrate of potash, 5 parts,	... ... 18°
Snow or powdered ice, 12 parts, Muriate of soda, 5 parts, Nitrate of ammonia, 5 parts,	... ... 25°

2.—Freezing Mixtures

Composed entirely with chemicals.

Mixture.	Temperature produced.
Muriate of ammonia, 5 parts, Nitrate of potash, 5 parts, Water, 16 parts,	... ... 10°
Nitrate of ammonia, 1 part, Carbonate of soda, 1 part, Water, 1 part,	... ... 7°
Nitrate of ammonia, 1 part, Water, 1 part,	.. ... 4°
Sulphate of soda, 3 parts, Nitrous acid, dilute, 2 parts,	... ... 3°

Fuming nitrous acid, 2 parts; water, 1 part, by weight.

These processes for the artificial production of cold are more effective when the ingredients are first cooled by immersion in other freezing mixture before uniting them.

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* *Photographic Journal.*

† *Druggists' Advertiser.*

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RAPID EXPOSURES.

The Use of Bromides.

The value of bromides as "accelerators," to use an old term, has long been universally recognised; but considerable difference of opinion exists as to the proportion of bromide to iodide by which the greatest degree of sensitiveness can be obtained. We are speaking, of course, of the wet collodion process; for in dry collodion the greater sensitiveness of bromide of silver is generally recognized. In the wet process, experiments have been very contradictory and uncertain. We cannot speak with certainty of the proportion used in commercial samples of collodion, but it is probable that about one grain of a bromide to four of an iodide is an average proportion, some commercial samples undoubtedly containing less bromide, and some more. Some advocates of the use of bromide use them in equal proportions with the iodide, and one distinguished photographer we remember announcing that, for certain instantaneous pictures he had produced, he used five grains of a bromide and four of an iodide to each ounce of collodion.

There is one point of vital importance in estimating and in gaining the full value of the bromides, which has unfortunately, so far as the wet process is concerned, been entirely lost sight of. It is well known and acted on, by the dry plate worker, that the conversion in the silver bath of the bromide in the collodion into bromide of silver is somewhat slow, that it requires time, and is best effected in a strong bath. It is also known that the presence of unconverted bromide acts as a retarder. It retards development, and so practically renders more prolonged exposure necessary, if it be present in excess. It will be seen, then, that if a plate coated with collodion containing one grain of bromide per ounce, and another coated with a collodion containing three grains of bromide, were immersed in the same nitrate bath for the same length of time and exposed, the latter would appear less exposed than the former. The collodion containing three grains of bromide per ounce would, with the same treatment in the silver bath as the one grain sample, return a considerable proportion of unconverted bromide, which would act as a retarder, and so produce the impression that increasing the proportion of bromide in the collodion did not make the collodion more sensitive, but the contrary. And this conclusion would, under the circumstances, be correct enough. Increasing the proportion of bromide certainly does not increase sensitiveness, unless that bromide be converted into bromide of silver. But if it be converted into bromide of silver the case is altogether altered: the sensitiveness is greatly increased, and the character of the image is modified, being singularly soft and detailed, instead of hard and full of contrast.

We appeal to the experience of every amateur who has extensively worked the wet process, and especially to the experience of every portraitist who has worked single-handed, as to whether he has not frequently met with a circumstance we are about to describe. In the midst of successful work, every plate yielding a brilliant, satisfactory negative, the operator is startled by a plate, with the same exposure and the same light as previous plates, starting out rapidly when the developer is applied, and yielding an over-exposed negative full of detail, but flat, and with a slight tendency to fog. If the matter be carefully traced at the time, it will be found that the plate in question has, from some accidental delay, been kept an unusually long time in the nitrate bath, giving time for the full conversion of the sensitizing salts into salts of silver, no trace of unchanged bromide remaining in the film. The result of this is that the film contains a larger proportion of bromide of silver, and is thus rendered more sensitive, and it is deprived of the unconverted bromide which acts as a retarder during development.

The marvellous rapidity which has been attained in bromide emulsion plates, both with collodion and gelatine, is probably largely dependant upon the absence in the film of retarding agencies. And we feel satisfied that, if the fact in question has been borne in mind in making trial of the value of increased doses of bromide in collodion for the wet process, giving the plates with such collodion a longer immersion, a greatly increased sensitiveness would have been attained. With the greater sensitiveness of the film, and the removal of the restraining agency of the unconverted bromide, a new difficulty would, of course, be encountered, as a tendency to flat, slightly fogged pictures would probably ensue. This difficulty would have to be met by modification of the developer. Possibly the use of a strong iron developer with a trace of nitric acid would meet the case. We are now writing for experimentalists, offering suggestions based upon past experience, and expressing convictions we have long entertained, but have not the leisure to verify by systematic experiment.

Various experiences all confirm the idea which we have suggested, which has had a partial recognition, but has never been clearly apprehended or enunciated. Every photographer who exposes several images in succession upon one plate is familiar with the fact. We remember the late Mr. Burgess, the inventor of the Eburneum process, when working it in our presence, and producing four transparencies on one plate, pointing out that the one last exposed required fully one-fourth less exposure than the first, and was generally a different kind of image. In such cases a process equivalent to leaving the plate in the bath is in progress: the free nitrate on the plate is effecting a reaction with the bromide left unconverted and forming bromide of silver, which renders the film more sensitive, and removes the restraining unconverted bromide. Other experiences of a similar nature will occur to many readers. We do not suggest that M. Boissonas' reduction of exposure is dependant upon a recognition of the facts we have indicated; although the fact that the only modification in the wet process made by that gentleman consists in addition to the collodion and developer is suggestive. M. Boissonas has, however, a right to his method, and to whatever profit it may yield him, and we should not feel it fair to try to pluck out the heart of his secret. But we feel satisfied that in the principle we have pointed out there is basis of considerable exaltation of the sensitiveness of the ordinary wet plate.

In trying large proportions of bromide in collodion, it will be found that for many reasons bromide of cadmium is most available; but it should be borne in mind that as the cadmium salts have a tendency to glutinize collodion, it is wise to use a pyroxyline made at a high temperature, yielding a limpid collodion; as a large dose of cadmium salts added to some samples of collodion would render them unfit for use altogether.

SUGGESTED CHANGE IN PHOTOGRAPHIC COPYRIGHT.

THE state of literary and artistic copyright in this country is, as every one interested in the question is aware, one of the utmost confusion, inconsistency, and contradiction, the result chiefly of piecemeal legislation on the subject. With a view to effect a revision of the laws, and bring all the departments of the subject under one general statute, a Royal Commission was appointed, nearly three years ago, to examine the whole question, and report thereon as a basis for fresh legislation. The report of the Commission has just been issued. It is a very comprehensive and interesting document, dealing, for the most part, with the interests of authors and artists and with those of the public in a fair and judicial spirit. It is no part of our duty here to enter into the general question of copyright, otherwise we should have felt it necessary to complain that a man's property in his work is regarded as a less secure property than that in land or houses. That which should be the most inalienable of all property—the produce of a man's brains—is treated as something which may be protected, or not; or protected in such degree as may be consonant with the interests of the public who may wish to partake of that property without consulting its owner as to conditions. In the report of the Commissioners this idea is not carried out to its ultimate issues, although it underlies many of the recommendations. But in the supplementary reports of some of the members of the Commission the existence of copyright is distinctly based on public interest, and not on any proprietorial rights of authors or artists, and the operation of the law is recommended to be limited by the extent to which public interest can be served.

One of the most important questions which arise in the consideration of fine art copyright is as to the ownership, and after discussing the question the Commissioners decide to recommend that copyright shall pass with the sale of a picture without separate stipulation. A strong impression existed amongst the Commissioners that this should obtain with photographs as well as paintings, &c., giving the sitter the copyright in his portrait. It was, however, eventually decided that the copyright should rest with the possessor of the negative, and pass with the sale of the negative only, as in the case of a painting. Questions concerning photography arise throughout the report; but we may here reprint a few paragraphs referring especially to photography, and making specific recommendations:—

> Though in the preceding paragraphs we have spoken only of paintings, the law is the same as to drawings and photographs; and we think that, whatever changes may be made in the law as to paintings, the same should be made with regard to drawings.
>
> Photographs, however, present some difficulty. At the present time they are coupled by Act of Parliament with paintings and drawings, and are subject to the same law, but, as we have before pointed out, we believe this circumstance arose merely from the fact that before the year 1862, when the Act was passed, there was no copyright protection afforded by the law for either of these subjects, and it was then thought right that photographs should be protected as well as other works of art. On consideration, however, it will be seen that photographs are essentially different from paintings and drawings, inasmuch as they more nearly resemble engravings and works of a mechanical nature, by which copies of pictures are multiplied indefinitely.
>
> We propose that the term of copyright in photographs should be thirty years from the date of publication, except when originally published as part of a book. In the latter case it should be for the term of copyright in the book.
>
> But the point upon which we feel difficulty is, whether the copyright should be assimilated to that in paintings and pass to a purchaser, or whether it should remain with the photographer. When photographs are taken with a view to copies being sold in large numbers, it is practically impossible that the copyright in the negative should pass to each purchaser of a copy, and it must remain with the photographer, or cease to exist. On the other hand, the same reasons exist for vesting the copyright of portraits in the purchaser or person for whom they are taken, as in the case of a painting. Indeed, considering the facility of multiplying copies, and the tendency among photographers to exhibit the portraits of distinguished persons in shop windows, it may be thought that there is even greater reason for giving the persons whose portraits are taken the control over the multiplication of copies than there is in the case of a painting. It therefore becomes a question whether it is not necessary to make that distinction between photographs that are portraits and those that are not, and between photographs taken on commission and those taken otherwise, which we have deprecated in the case of paintings.
>
> We suggest that the copyright in a photograph should belong to the proprietor of the negative, but, in the case of photographs taken on commission, we recommend that no copies be sold or exhibited without the sanction of the person who ordered them.
>
> The same questions arise with respect to engravings, lithographs, prints, and similar works. These arts, like photography, may be employed for the purpose of issuing a large number of copies of a picture, or merely for the purpose of executing a commission and printing a few copies, of a portrait for instance, for private distribution by the person giving a commission among his friends. We think, therefore, that so far as regards the transfer and vesting of the copyright these arts should be placed upon the same basis as photography.

In dealing with the question of registration, a point is definitely stated about which some uncertainty has existed. In the law as it stands, an action for piracy may be instituted against the infringer of a copyright in a book, even if the copyright have not been registered at the time of the infringement. It is necessary, however, to register before commencing legal proceedings. It has been thought by some that the same law would obtain, therefore, in relation to photographs, and that if piratical copies of an unregistered photograph were issued, the author could, by registration, acquire a right to proceed against the infringer. This, however, according to the remarks of the report, is not the case. In the case of works of fine art, registration is a preliminary to the acquisition of copyright. It is recommended in the report that in future registration should not be permissive but compulsory, that the fees should be reduced, and that an official receipt should be given, the production of which in court should be *prima facie* evidence of title to copyright. Referring to the difficulty of dealing with hawkers of piratical copies of photographs and engravings, a power of search is recommended, and of seizure of piratical copies. Some interesting suggestions on colonial and international copyright, to be applicable alike for literary and artistic productions, are made, to which we need not here refer at present.

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EXPLANATION OF THE ACTION OF DYES ON FILMS.

BY CAPT. ABNEY, R.E., F.R.S.

IN a recent private correspondence I have had with Dr. Vogel, he drew my attention to an experiment in regard to the action of dyes on silver bromide which certainly did not agree with the broad view I enunciated, that for a dye to be effective in causing an action by those parts of the spectrum which it absorbs, it must combine with the silver. I may say that I still hold this view in the main, and in the sense I give it in my work on Photography in the Text-book of Science series. In it I say that the action of dyes may probably be due to their own alteration by light, and that the particles of the altered compound may have the property of acting as nuclei to which the reduced silver compound may be attracted when development is carried out. At the time when the work in question was written the hypothesis was arrived at by (what I may call) inductive reasoning, rather than by actual experiment, and the idea lay dormant till lately, when Dr. Vogel reminded me of an experiment he had carried out. He says that if a bromide film prepared with excess of bromide be washed, and then treated with certain dyes and with tannin, morphia, or other "sensitizers," that the same result is obtained as if the film were prepared with excess of silver, and dyed; in the latter case a presumption being made that the dye would combine with the silver. I repeated the experiments, and can confirm Dr. Vogel's results. From what I can gather, Dr. Vogel looks upon the dye as what he calls an optical sensitizer; in other words, that the fact of a dye absorbing certain rays causes that light to be effective on the silver compound, even though otherwise the latter would be unaffected by it, and that the action is aided by the presence of a chemical sensitizer such as those I have alluded to. This view of the matter requires very careful consideration, since it modifies the usually accepted theory of the vibratory motion of the molecules of the silver compound, a matter so grave that I should hesitate long before I accepted the idea. At the same time the experiments quoted by Dr. Vogel were so striking that his conclusion seemed very possible.

Reviewing all the circumstances, it seemed to me desirable to see if the hypothesis I had propounded in my work referred to might not account for the action of the dye, and the following experiments were tried:—

Plain collodion was slightly dyed with various dyes, and exposed to the spectrum; in some cases there was visible evidence of change of colour in the dye, caused by the rays absorbed by it. Over these dyed films collodio-bromide emulsion was poured in the dark room, and the plate was developed as if the latter had received exposure. To my great satisfaction I found that the bromide film developed exactly *on that part* beneath which the colour of the dye should have changed* by its absorption of light.

With cyanine blue the effect was most marked, and also with eosine.

It will be remembered that I brought before the Photographic Society of Great Britain some experiments in which I showed that the image on an exposed film might be developed on another film if the latter were in contact with the former, and these experiments are exactly analogous.

Photographers also are well aware that development will often indicate the presence of organic matter in some particular state on a plate, the silver being reduced or deposited at those parts where such matter exists. The organic matter of the dye, when acted upon by light, seems to be reduced to that same state, and development can proceed upon it when so altered. If a developer causes the reduction of metallic silver in ever so small a quantity upon any part of a plate, density will soon be secured by the experimentally proved theory of non-existence of silver bromide in close contact with metallic silver, or rather the reduction of the former by the latter to the state of developable sub-bromide.

The fact that the dye is non-effective in the presence of an excess of soluble bromide is due to the same reason that an ordinary bromide plate is not developable when an excess of soluble bromide is allowed to remain in the film. I may remark that the dye in a dyed bromide film is more amenable to the action of light than when experimented with in the way I did, because the surface of the dye exposed is much larger in the one case than in the other.

With dyes which are not retarders to development, the amount of dye which may be present to effect the action that Dr. Vogel has noted need not be small; but where it is a retarder, such as eosine which contains bromine in combination, the stain on the film should evidently be light, otherwise the developing action will be retarded, unless there be an excess of silver originally present to combine with it. Up to this time, then, I cannot accept the theory of optical sensitizers.

THE STUDIO.

BY W. HEIGHWAY.

Our first thought on entering the studio is to the glazed portion of the roof and side through which we get the light to illuminate the sitter. If the skylight (to adopt a convenient general term) is already built, we shall most likely experience the luxury of a strong feeling of disappointment, because, in all probability, the structure will be a miserably bad one.

Generally speaking, the skylight is the greatest enemy the photographer has—except himself.

The first and principal cause of the bad construction of our lights is undoubtedly from the awkwardness of the building in which they are fixed, and the disadvantages of high walls hemming them in, and then from the lack of knowledge and the uningeniousness betrayed by the builder of the skylight.

No doubt the great majority of photographers who build skylights have not *carte blanche* for the exercise of their knowledge and skill; sometimes they may only cut a hole in the side and roof of the house, and do the best they are able with that.

Now this is not enough. There can be no doubt that much of success depends on a well-designed and well-built skylight.

We need not here speak of the roof that with a heavy shower of rain swamps the gallery, because that is a fault of construction an intelligent glazier ought be able to avoid. Our consideration is of the skylight which will best serve for the artistic lighting of the sitter.

Our aim is to secure light and dark, and the skylight which most perfectly produces them in all the beautiful and subtle gradations of tone, from the high light to the deepest shadow, it is obviously our end to possess.

If the light strike the sitter from one point, the lights are too white and glaring, and the darks heavy and lacking in detail. Gradation of tone is lost, and the contrasts are severe and inartistic.

On the other hand, two sources of illumination from opposite directions of equal, or nearly equal, intensity would kill all contrast, and produce a flatness and uninterest fatal to a work of Art.

Diffusion of light combined with a vital and well-directed direct light to give life and vigour and soul to the picture is what we really require.

We have to guard against the entrance of the sun's rays, and the northern aspect is most free from this objection.

You must not be unreasonable enough to expect to be able to construct a skylight equally suitable to all styles of picture, for full-length pictures are best illuminated by a low skylight, and head and bust pictures under one of higher construction. Where every class of work is done, it were better to strike a mean between the two, and thus equalize the advantages. This done, you may introduce a platform for standing figures, so nearer to approach the light.

The combination top and side-light has been generally adopted, and there can be no doubt that it presents, with many advantages, the fewest drawbacks; and under skilful control the nicest gradations of light and shade may be secured both for heads and for full-length pictures.

Too great extent of glass is worse than useless.

A side-light twelve feet in width by four feet in height, commencing four feet from the floor (being a side of eight feet, four feet boarded up and four feet glass) will meet every requirement. The same dimensions of top-light rising at an angle of thirty-five or forty degrees.

At both ends of this light should be at least five feet boarded up, so that pictures may be made at either end of the studio. This is a matter of great importance where it is an object to make really artistic pictures, as only in this way can the two sides of the face be taken, unless, of course, one is to be invariably taken in shadow and the other in light, a state of things an artist would scarcely like to be bound down to.

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* Members of the Photographic Society may remember a card of dyed papers I showed at the meeting, all of which had altered by exposure to light.

The sloping side-light from a point four feet from the floor rising (at an angle of sixty degrees) ten feet, so that the dimensions of this light are ten feet by twelve.

A greater amount of glass than here given can only prove a source of trouble and anxiety, and must be almost always screened off.

The blinds necessary for these lights should (in the case of the top and side-light) be fixed to draw down from the upper ridge of the top-light, and up from the bottom of the side-light, *so that the light is never divided.* With the sloping side-light the blinds should be arranged in the same way, meeting in the centre; and with three widths of blinds independent of each other any required effect may be obtained.

White calico is the best material, and fitted on spring rolers you have simplicity with efficiency combined. The addition of blue or black blinds is to be avoided as unnecessary and awkward.

The studio should not be too narrow, as many effects are onlly to be obtained by working diagonally across the floor. That supposed in the dimensions here given is twelve feet across by twenty-two feet in length. Greater measurement either way, though it would not affect the amount of glass, might be found much more convenient for working.

The walls of the studio may be papered, or, better, coloured with a pleasant middle tint of grey.

Let everything about the studio be bright and clean and cheerful to look upon, for the sake of expression.

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REVERSING PHOTOGRAPHIC NEGATIVES.

BY M. MICHAUD.*

In the hope that my method of reversing negatives may be of some interest to photographic manipulators, I am induced to subjoin a description of the process which I adopt.

On a bath of a five per cent. solution of gelatine that has been filtered through a bag of swansdown calico, and is kept at a moderate heat on a water bath, I lay a clean pellicle of the so-called "leather collodion" attached by a couple of drawing pins to a straight wooden lath, and leave it in contact with the gelatine for about three minutes. I then withdraw it from the bath with an even film of the liquid adhering to it, and hang it by the lath on a rack (made for the purpose) to dry in a rather warm atmosphere. The same is done with all the other pellicles which it is intended to use, and directly afterwards they are plunged successively into a solution containing fifty grains of alum to every litre of water, and in this each of them is allowed to remain for the space of two minutes. Taking them out of this solution, I next wash them for two minutes longer in two pans full of pure water, hang them up to dry, trim the edges, and put the pellicles by between sheets of paper for further use.

The negative which it is intended to reverse is placed, directly after fixing and washing, in a pan of water; the alum gelatine pellicle is laid in another pan of water with a sheet of waxed paper rather larger than itself. I now lay the pellicle, with its gelatinised side downwards, on the negative (taking care to prevent the formation of air-bubbles), place on it the waxed paper, and press all three closely together with the squeegee. The waxed paper, which serves any number of times, is now taken off, both sides of the negative are wiped dry, and it is placed in a positive printing frame. I then cover it with a thick and dry piece of blotting paper, close the springs of the frame, and submit it to the direct heat of the sun, or place it in a drying oven, where it dries very rapidly. If the negative be now placed in a pan of warm water, the pellicle, with the reversed picture impressed on it, will soon separate, and at the end of about a quarter of an hour it may be detached by hand and put to dry, after which it will serve for printing from.

If the pellicle be excessively thin, and therefore difficult to manipulate, it can be afterwards placed on a glass plate previously gelatinized and dried, and pressed on to it by a squeegee as before. This is again inserted in the printing frame to be rapidly dried.

Instead of transferring the negatives in this way by means of collodion pellicles, which offer many advantages over the gelatine usually employed, single waxed papers can be used in very many cases, provided they are treated in the manner above indicated for the pellicles. In this case the negative will never require to be transferred a second time to a glass plate; it must only have a hot iron passed over it, which will make it quite smooth, as well as render it transparent.

These methods of transferring negatives can be applied without modification in the case of old negatives that have been simply gummed.

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PHOTOGRAPHIC RENDERING OF THINGS UNSEEN.

The power of photography to depict, under certain circumstances, things invisible to the human eye has been repeatedly demonstrated. This fact is utilized in a story that appears in the *Leisure Hour*, to show how photography was rendered available in verifying a suspected falsification of accounts and erasure in account books. As the story is well told, some extracts will interest our readers. Those anxious to follow the continuity of the tale we must refer to the magazine itself; we simply plunge into the middle for matter of photographic interest. Here is the description of an East End photographic establishment:—

"The lodging which Captain Chubb occupied in Little Tower Hill, and to which he betook himself on his return to London, was the first floor of a small house belonging to a photographer, or, as he preferred to call himself, a photographic artist. His name was Roobins, and our readers have heard of him before. It was he who had given Mr. Adolphus his first instruction in photographic art, and it was to him that he had alluded when, in his conversation with Mr. Huxtable, he had spoken of 'a friend who had been several times in Newgate.' Mr. Adolphus had mentioned these lodgings on Little Tower Hill to Captain Chubb, and the captain, who engaged them upon his recommendation, had no reason to be dissatisfied with the result. With the exception of the drawing-room floor, all the house was artistic and photographic. The front shop was a portrait-gallery, and the back parlour an 'art repository and bureau.' Chemical operations went on in the back kitchen and cellar, the attics were retiring and attiring rooms, and the studio was on the roof. The shop-window and cases displayed a great variety of portraits which did considerable credit, not only to the skill of the artist, but also to the largeness and liberality of his sentiments, political and general. There were sailors in great number, but soldiers also; there were statesmen of all principles—and perhaps of none—Tories, Whigs, Radicals, Home Rulers, and stump orators, mingled together without any invidious distinction; there were popular preachers and popular actors, and all these smiling at each other and at the people who stopped to look at them with a universality of benevolence which was exemplary. There were judges, magistrates, and policemen even, and poets and historians, of every nationality and costume. There was a second gallery of portraits—that is to say, another compartment in the glass case—reserved for celebrities of a different stamp, notorious criminals and their victims, and the instruments of cruelty with which crimes had been committed, and the places which had been rendered infamous by their misdeeds. Such a cabinet of horrors would seem to be almost a profanation of the daylight by the help of which it was depicted; but light passes everywhere and touches everything without contracting any defilement; light can set its mark upon every object, however loathsome and unnatural, without being itself polluted; and that can hardly be said of anything else in nature.

"Mr. Roobins was a meek, quiet, pleasant-looking little man, not at all the kind of person one would have suspected of being associated with such horrors, yet the course of his practice had in reality brought him into much more intimate communication with these pests and outcasts of society than with any of the higher and nobler celebrities, for, before setting up in business for himself, he had been employed by the police, and had taken part in many a secret investigation in which his art was made available for the solution of mystery or the detection of crime. It was rumoured that he still assisted in matters of this kind occasionally, but, if so, he never spoke about it.

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* *Moniteur de la Photographie.*

"Reggie Carlton had been a frequent visitor at Mr. Roobins's from the time when Captain Chubb first took up his abode there, and the good-natured photographer made him free of his studio, and admitted him to his dark closet, and showed him some of the mysteries of his art. When business was slack he made a 'subject' of him; and the boy was to be seen in various attitudes and costumes, now sitting on the high-backed chair, the seat of many celebrities, now balancing carelessly upon the corner of a valuable mediæval table, now playing with a three-legged, one-eyed dog - but that was before Chalk disappeared from the scene—and now riding upon his own back or shaking hands with himself, as if there were two Reggies in the world instead of one, a thing which Captain Chubb declared could never be; no, never!

"One day Reggie persuaded the skipper, soon after his return from Littlebar, to sit down in the celebrity chair, and then placed himself upon his knee, and called out to Mr. Roobins to 'take them so together,' but the skipper suddenly turned very grave, and got up out of the chair and left the room.

"'No, no,' they heard him say as he went stumbling down the little winding staircase; 'not yet, if ever. No.'

"'What's up?' Mr. Roobins asked.

"'I don't know,' said Reggie; 'he turns away like that sometimes when I talk about my mother. He used to be so kind to her, and liked to talk about her, but he never goes to see her now. It's not her fault, I know."

"'H'm!' said the photographer; 'your mother's a widow, ain't she?'

"'Yes,' said Reggie.

"'That accounts for a good deal.'

"The boy thought over those words, but could not make much meaning out of them, and Mr. Roobins declined to give him any explanation. . . .

Shortly we find photography is called in to photograph pages of accounts in which erasures are suspected:—

"It happened one evening about this time that Mr. Adolphus, who had left the counting-house at the usual hour, returned there a little later to fetch something which he had forgotten, and, to his surprise, found Mr. Jones still perched up on his rostrum, and deeply absorbed in his books.

"'Why, Mr. Jones,' he said, 'what's up? Are you going to sit there all night?'

"'I don't know; I can't say,' said the old man, with a dazed expression. 'I've got here something that puzzles me, and I want to get it right. I couldn't rest if I were to go away, so I may as well go on with it while I can see.'

"'You had better have candles.'

"'I don't mean that,' said Jones; 'there's light enough; but I get so confused looking at the figures that they seem to swim before my eyes.'

"'Let me help you,' said Mr. Adolphus, good-naturedly. 'I can read, if I can't do much else.'

"'Thank you, sir, thank you. Well, if you don't mind staying a little while, you might call over these items while I compare them.'

"The items were very numerous, and the two men worked on together for more than an hour."

"'I can't make it out,' said Jones. 'I never was puzzled in this way before. I must be getting stupid. I used to say I would never stay in the office after I began to go off; and my head seems as clear as ever it was in most things; but there's something wrong here, and I can't tell what it is.'

"'Give it up for to-night, Mr. Jones, and come to it fresh to-morrow morning; you'll manage it then.'

"'No, Mr. Adolphus. You don't know all. I have spent several evenings over these books already, and I don't get any nearer to the solution. Sometimes I think somebody must have been tampering with the books, but I dare not hint at such a thing unless I could prove it. And I can't find any indication of it in the figures or the writing, not the slightest; only they won't come right.'

"'Have you spoken to Mr. Goldie about it.'

"'No, that would be no use. If I cannot get out of this muddle by myself, I shall not be fit to hold my place here any longer. I must get it right, at all events, if I give up afterwards. I couldn't bear to have it said I left the books in disorder.'

"'They seem to be as fair and clean as ever they were,' said Mr. Adolphus; 'copperplate and artist proof I alway said, don't you know, except where Huxtable has marked them, more shame for him, but you can't help that.'

"'There's no erasure,' said Mr. Jones, doubtfully, 'not the slightest trace of any. It must be a mistake of my own somewhere; the figures are all my own, and yet there's something wrong; and that's all I can say about it.'

"'I suppose nobody could get at the books except Huxtable.'

"'Nobody else.'

"'Does he ever come to the office out of hours?'

"'Oh, yes; he often stays late, writing letters, or what not.'

"'I should keep an eye on him if I were you.'

"'I do so as well as I can.'

"'I should get into that cupboard some evening and keep an eye on him through the keyhole, when he doesn't know you are here.'

"'That's not in my way, Mr. Adolphus.'

"'Employ a detective, then.'

"'What? A detective in Goldie Brothers' house? You forget yourself, Mr. Adolphus.'

"'Well then, I don't see what is to be done, except for you to turn out of this place now, and go at it again to-morrow. Come along.'

"'I shall have no rest, Mr. Adolphus.'

"'You won't if you stay here, that's quite certain; so lock up the safe and come with me.'

"Mr. Jones yielded to his friend's importunity, and they left the counting-house together, Mr. Adolphus parting with him on London Bridge, after seeing him safe into an omnibus.

"'Huxtable has had a hand in this, don't you know,' said Adolphus to himself as he turned to go his own way. 'He's as deep as a well, but there's no truth at the bottom of him Poor old Jones! it will be the death of him if he does not find it out, or if anybody finds it out for him. I suppose there's money to account for, though he would not say so. I wish I I could help him. I wonder what Captain Chubb would say? I'll go round that way, and talk to him.'

"Captain Chubb was smoking a pipe in his drawing-room, and received Mr. Adolphus with his usual cordiality. He listened to his account of Mr. Jones, and then, after a few minutes' silence, said—

"'I don't like to speak too hastily about a thing of this kind, Mr. Adolphus. You see this Huxtable has not behaved very well to me, and I might be prejudiced against him. I don't like him, that's the truth, and I would not trust him farther than I could see him. But I should not like to suspect him wrongfully, for all that. There's a man down below who might give us a hint.'

"'You mean Roobins?'

"'Yes.'

"'Let's call him up and consult him—in general terms, of course, and without reference to any particular case.'

"Mr. Roobins was always glad to have a chat with the skipper and with Mr. Adolphus, and came as soon as invited; and the subject on which they desired information was presently introduced

"'You want to know whether ink can be erased without leaving a mark? Of course it can. I've seen documents from which a name or a figure has been taken out so neatly that no expert even could discover it. I am an expert myself. I couldn't tell you the means by which it's done, but I know it is done.'

"'And without soiling the paper or the page?'

"'Without a mark, so that you would never guess that there had been any tampering with it. Nobody could find it out.'

"'How was it found out, then?'

"'I'll tell you; by art, sir, art. Photography will find out anything. A good photograph will show marks that can't be seen in the original.'

"'That is quite true,'' said Adolphus. 'I know that by experience.'

"Mr. Adolphus had a private studio at home, with a gallery of portraits, for which all his friends were victimised in succession, a sitting being required from everyone who called on him by daylight. Most of his studies were more or less blemished by round flowing spots upon their faces, by a statue-like blankness of the eye, or by some distortion of the features; but he hoped to attain perfection some day through Mr. Roobins's instruction."

"'I know it by experience,' he said. 'Most of my photographs have marks, wavy blots, don't you know, which are not to be seen in the originals, as you say. I suppose they have been there at some former time, and Art brings them out again. I never thought of that before. Or they may be representations of something within; indications of character, don't you know.

Fancy being able to read another fellah's ideas, or to show him all the freckles that he ever had upon his face by photography! If that is not high art, I don't know what it.'

"'It is not so ridiculous as you seem to think,' said Mr. Roobins, who was an enthusiast in his profession. 'One thing is certain, that light is reflected or absorbed in different degrees from different substances. Paper which has once been written upon shows differently from paper which has not; it produces a different effect upon the chemicals, and by that means characters which have been written and obliterated can be reproduced and made to show themselves. Photographic art will do anything. I don't think we have half learned the extent of its powers yet. I believe it will be possible to photograph sounds some day; to take tunes as they are played, and to report speeches upon paper as they are uttered, from the vibrations of the air and the effects which they produce upon the rays of light.'

"'You have a good opinion of your art,' said the captain; 'and you are right. No man can excel in anything unless he is in earnest about it.'

"'I get my living by it,' said the other; 'but I take pleasure in it, also, for the sake of art. I'll give you a proof some day of what I say about those erasures. It is a curious result, and worth looking at.'

"'Could I do it, do you think?' Mr. Adolphus asked.

"'Yes, sir; I have no doubt you could, with a little instruction which I shall be happy to offer you, and with one of our superior full-sized cameras, which I can put you in at a moderate price. Your own would be hardly large enough.'

"'I think I shall have a try,' said Mr. Adolphus; 'just out of curiosity, don't you know. I always said I ought to have been a detective. I'll think about it.'

"The next day Captain Chubb and Mr. Adolphus had a long conference with Mr. Jones. The latter was annoyed and angry that Mr. Adolphus should have made any mention of his difficulty."

"'It was not right,' he said; 'you ought not to go and talk of things outside the Court.'

"'I only spoke of it to the captain,' Adolphus answered, and you had already let fall a hint upon the subject to him. You can trust him, don't you know.'

"'But this Roobins; what have you said to him?'

"'Not a word; the Court was not named; he has no idea at all of what we are about. So far as he is concerned, it is merely an experiment in photography.'

"'You are sure, then, that he suspects nothing?'

"'Quite sure.'

"'I thought you proposed bringing him here to photograph my books,' said Mr. Jones, much relieved.

"'Certainly not. I shall conduct the operation myself, don't you know, with your assistance, if you don't object to it. Nobody else is to be present, or to know anything about it.'

"'And where is it to be done?'

"'Oh, we must find a convenient place somewhere.'

"'It must be done within these walls if it is done at all,' said Jones, resolutely. 'The books cannot under any circumstances be removed from this house.'

"'We shall want a good light, don't you know,' said Adolphus; 'a room with plenty of glass in it. My tank has glass enough, but no light, else that might do.'

"'The books shall not be removed from this house,' Mr. Jones again asserted most emphatically.

"'Then I am afraid we must give it up, unless we go out upon the roof.'

"'What, in view of the opposite houses, and in public! Oh, Mr. Adolphus!'

"'I'll tell you what, don't you know,' said Adolphus, brightening up; 'talking of the roof—there's an attic, don't you know, full of lumber and rubbish, with a skylight, don't you know; it would be the very thing.'

"'Would that do?' Mr. Jones asked, reluctantly. 'Do you think that would do?'

It was evident that the old book-keeper had very little sympathy with the proposal, and did not like the idea of exposing his books to such an undignified audit as Mr. Adolphus had suggested.

"'Let us go and look at it,' Adolphus answered. 'I can soon tell you whether it will do or not.'

They went at once to the attic in question, and Mr. Adolphus pronounced it excellent.

"'It's as good a studio as any one need have,' he said. 'I'll bring my camera to-morrow, and take you first, Mr. Jones, by way of experiment, *in corpore vile*, don't you know. If it succeeds, we can try the books afterwards.'

"Mr. Jones did not understand Latin, but declined the offer as regarded himself, and it was decided that Mr. Adolphus should perfect himself in the art under Mr. Roobins' directions, if he thought proper to do so, and then, if the result of his instruction should be such as to render it worth while, Mr. Jones would seriously entertain the question of submitting his books to trial in the 'studio' above. Upon the strength of this, Mr. Adolphus purchased the new camera, and spent a great deal of time and money in perfecting himself in the use of it. He soon satisfied himself that the larger instrument was capable, like the smaller one, of producing in the copies marks and stains which were not to be seen upon the original subjects. He found, also, that writing which had been effaced could really be rendered visible when photographed, though it must be admitted that the traces of it were not so entirely gone from the document upon which his trials were made, and which had been expressly prepared for the purpose, as they seemed to be from Mr. Jones's ledger. He was sanguine, however, of making his art practically useful, and as soon as he had acquired, as he thought, sufficient skill, he made an appointment with Mr. Jones, and early one morning the apparatus was smuggled into the house, and everything prepared in the garret for the operation.

"'I don't like it, Mr. Adolphus,' the old book-keeper kept on saying. 'It is a strange thing to do in a house like this. It will be all over, I trust, before any one comes. I would not have it known to the clerks—Huxtable's clerks, too—on any account. Of course you will keep it a secret, whatever happens. I feel very much as if I were being made a fool of; and the books, too—the books, too—that's the worst of it.'

"Mr. Adolphus pledged himself to secrecy on his royal word, but Mr. Jones did not seem entirely reassured even by that. The ledger was posed, however, and opened under his own guardianship; and the instrument being duly focussed, the operation of 'taking' it began.

"Page after page was turned over, and the negatives were pronounced by Mr. Adolphus to be excellent. They could not tell what the result would be till they were printed off, which would require time; but the operator had not patience to wait for that, and paused after each page was photographed to examine the glass plate carefully with a magnifying-glass. The result seemed to justify his expectation; for upon some of them he fancied he could discover traces of figures and characters which were not in the books.

"'I can't be certain, don't you know,' he said to Mr. Jones, 'but I think I see writing. Look at it, Mr. Jones; look carefully.'

"Mr. Jones put on his spectacles and applied the magnifier, but, after a long inspection, shook his head and declared that he could see nothing on the glass but what was in the book. It was gratifying, to be sure, to see the page so well and clearly portrayed; and he should like to have one or two impressions to keep, he said, just for his own satisfaction; but as for any discovery, he had very little hope of it.

"'Your eyes are not so good as mine, don't you know,' said Adolphus; 'just look again. There, I am sure I see something. I can't quite read it, or make out what it is, but there are lines and figures in that space, I'm certain. I see it! I see it!' he exclaimed, after a further inspection. 'It will come out plainer in the printing. There has been an entry here which has been taken out again by some means. The books have been falsified! Money has been embezzled! Here are the proofs, and Huxtable is the culprit!"

Correspondence.

PHOTOGRAPHY AND ANTHROPOLOGY.

Sir,—I am authorized by the Anthropometric Committee of the British Association for the Advancement of Science to ask the favour of your inserting this letter in your journal, with a view to obtain the assistance of your readers in carrying into effect a portion of the duty entrusted to the Committee, viz., "the investigation by means of photographs of the national or local types of races prevailing in different parts of the United Kingdom."

The plan which the Committee have thought it best to adopt is to select a number of districts in which it is believed a distinct type prevails, and in each such district to request the assistance of as many competent observers as can be found: each to be asked to obtain a limited number of photographs, six to ten, representing in his opinion the type chiefly prevalent among individuals belonging to families long settled and intermarrying in the district. From the materials thus obtained the Committee hope to be able to select representative specimens.

In the carrying out of this plan, the assistance of professional and amateur photographers, as well as of medical men and clergymen, in the collection of suitable photographs, would be of the greatest service.

It is suggested:—

1st. That the selected individuals should be adults.

2nd. That the details of their pedigree, as far as possible, should be given.

3rd. That, in general, only those should be accepted whose two parents and four grandparents were born in or belonged to the district.

4th. That the colour of hair and eyes should be stated, if practicable.

5th. That the photograph should be accompanied by a written description of the particular features which they portray as being characteristic of the district.

We shall be greatly obliged by receiving communications from your readers, indicating whether they can do us the service of selecting six or ten typical photographs, and in what district—whether they can place us in communication with others whom we may ask to do the like—and, generally, any suggestions for carrying out the object of the Committee.—I am, sir, your obedient servant, E. W. Brabrook.

Office of the British Association, 22, *Albemarle Street, W., June 29th.*

Proceedings of Societies.

Liverpool Amateur Photographic Association.

The usual meeting of this Association was held on Thursday evening, the 27th ult., at the Free Library, William Brown Street, Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and confirmed.

Some exceedingly beautiful negatives taken by the gelatino-bromide process were shown by Mr. H. Houlgrave. These were all the more interesting as they comprised both views and portraits, with their respective prints, so that their printing qualities could be examined. Mr. Houlgrave also exhibited a developing dish with wooden sides and glass bottom. Mr. Houlgrave described his method of working, and said he had no difficulty in developing up to the edges of his gelatine plates, as he moistened them first in a solution of one ounce of alcohol to ten ounces of water, using a little of the same solution in his developer.

Mr. Ellerbeck exhibited a number of views he had taken during a recent tour in Switzerland.

The presentation prints for the past year were distributed, the print being a fine 24 by 18 view of the Arch of Constantine, from a negative by Mr. O. R. Green, enlarged and printed in carbon by the Autotype Company.

The July meeting is intended to be an outdoor one, if arrangements can be made for a suitable locality.

Talk in the Studio.

The St. Louis Practical Photographer.—We have already noticed the existence of a very energetic monthly contemporary in America, the *St. Louis Practical Photographer.* We may now call the attention of our readers to an advertisement in our columns in which Mr. Fitzgibbon, the energetic proprietor and editor, offers to supply his excellent magazine to English photographers by post, every month, on receiving fourteen shillings for the twelve months in advance.

Rapid Dry Photography.—Mr. J. A. Smith, of Rotherham, sends us a fine card portrait of a baby, the negative of which was, he states, taken on one of Swan's dry plates with less than a second's exposure. The result appears to be satisfactory in every way.

The Le Neve Foster Testimonial.—A movement has been set on foot for the presentation of a testimonial to Mr. Peter Le Neve Foster, the Secretary of the Society of Arts, upon the occasion of his completing his 25th year of service as chief executive officer. When Mr. Foster became its secretary the society numbered only about 1,000 members. At the present time it numbers about 4,000. During the period of Mr. Foster's administration the society has successfully dealt with many important public questions, including those of elementary and technical education, patent and copyright law reform, international exhibitions, public health, Indian and colonial and many other topics. Upon these grounds an appeal is made to the members of the society and the public for their co-operation.

To Correspondents.

W. W.—The sensitiveness of collodion is mainly affected by the sensitizing salts; but the character of the plain collodion also has its influence. For instance, if the pyroxyline have not been perfectly washed, any trace of acidity being left, the collodion will be insensitive. In some cases where the pyroxyline is made at a very high temperature, a substance is formed which can form an organic salt of silver, and this contributes to intensity, but reduces sensitiveness. At one time the precise physical conditions of the collodion were thought to exercise considerable influence on the sensitiveness, and it was thought best to use pyroxyline made at as low a temperature as was compatible with securing solubility. It has been found a good plan to wash the pyroxyline in very hot water, or even to boil it to remove any traces of matter soluble in water, or which might form a silver compound in the nitrate bath.

A. E. S.—Caustic soda and caustic potash are both soluble in alcohol. (*b*). It is not desirable at any time to intensify in daylight. The reason is obvious. Intensifying is a reducing process: it consists in reducing the silver salt into metallic silver, the reduction taking place only upon those parts already containing reduced silver. But light is a reducing agent as well as the pyro, and has a tendency to produce a general reduction, the result of which is fog. (*c*). The process of reducing the intensity of a negative is generally attended with a little risk, the degree of risk being determined by the method employed, and the amount of skill, experience, and care used. Cyanide of potassium will reduce intensity, but it generally destroys the half-tones first. Perchloride of iron effects the task more evenly. Tincture of iodine skilfully used is very good for the purpose. (*d*). A mixture of bichromate of potash and sulphuric acid is a very powerful oxidizing agent. The following formula will answer. Take of a 40-grain solution of the bichromate, 1 ounce; water, 3 ounces; sulphuric acid, ½ ounce. (*e*). The application of tincture of iodine to a silver image on collodion will convert the image into iodide of silver. Flow this with a solution of nitrate of silver, and expose to light a few seconds, then proceed to apply pyro, and the image will gradually be converted into one of reduced silver. (*f*). Nitric acid readily acts on lead; sulphuric acid also, but not so readily. (*g*). Pyrogallic acid is recommended for developing collodion transfers, because it gives a better tone. The molecules of silver thrown down by iron development are more crystalline and metallic, and have not so much richness of colour, as those reduced by the organic developer. About 1½ grains of pyro would probably be found equivalent in developing action to a 15-grain iron solution.

M. M. D.—A very small percentage of the silver used in photography really remains in the finished pictures. A careful worker will save seventy or eighty per cent. of the silver from the various forms of waste. We have published many articles on the mode of effecting this saving, both in the News and Year-Books.

J. F. E.—A dipper of silver wire answers well in many respects; but if the silver bath be kept acid with nitric acid, the silver wire will be attacked. We prefer glass. A stout strip of glass one and a half or two inches wide, and a little longer than the bath is deep, with a shoulder of glass cemented to the bottom with marine glue, answers well. A dipper of wood—white pine or sycamore—well saturated with paraffin answers very well.

A Printer.—No, the carbon process is not free from patent control. The first patent of Mr. Swan for the manufacture of tissue has expired; but all Mr. Johnson's patents remain, and these include the method of using a rigid or impermeable support for development. The announcement to which you refer in an American contemporary was an error probably made in ignorance.

B. R.—If water be an important feature in your landscape, try to get a position for your camera somewhat above it, as by this means you get rid to some extent of the white glare of which you complain. A skilful and artistic printer will sometimes get rid of the mass of white which water presents by printing-in a reflection of the landscape which adjoins the water. To do this well, a paper negative should be made from the original, and care taken not to print too sharp an image.

J. A. Smith.—Many thanks. The print and facts are very interesting.

The Photographic News, July 12, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Photographic News in a Chemical Journal—Anthropology and Photography—The Coming Total Eclipse—The Jablokhoff Light.

Photographic News in a Chemical Journal.——Last week we gave some extracts from the *Journal of the Chemical Society* anent two investigations to which the conductors of that periodical desired to draw the attention of the Fellows, and which our readers may remember related to the colouring of mixed pickles otherwise than with copper, and the fabrication of artifical champagne from glycerine and other substances. In the last number of the *Journal* there is a short article upon "Photographic Printing in Natural Colours," purporting to be a digest of a paper by Kaiser in the *Chemischen Centralblatt.* From what we can gather, it would seem that printing in natural colours is a *fait accompli,* for we are told that "J. Albert, of Munich, has succeeded in placing this process on a scientific basis." Unfortunately, he "keeps secret the technical details." The *Journal of the Chemical Society* seems to have conspired with M. Albert to keep such details as he has published secret too, for if it is difficult to make out how the Munich photographer has solved the problem, it is more difficult still to understand the organ of the Chemical Society. "By decomposition," it says, "the elementary colours of an object are obtained in the relative strengths in which they occur in the original colour. These optical decomposition-products act on sensitised plates with an intensity varying with their strentghs. Thus, a pure green object will give a plate on which only yellow rays have acted, and another on which only blue have acted" Further, we are told "only three colours are required to produce the various natural colours by this method, namely, a pure yellow, a pure blue, and a pure red." It may *only* require these three pure colours to secure natural colours, but how we are to get them is a mystery which has long puzzled photographers. To get the "optical decomposition-products" to "act on sensitized plates," whatever that may mean, appears to us a much less difficult job than finding the three *pure* colours referred to. The whole affair has arisen, doubtless, from the colour impressions which M. Albert of Munich exhibited many months ago, and in respect to which our readers have already been informed. Upon matters photographic, therefore, the Journal of the Chemical Society is hardly so well posted as in such investigations as making sham champagne and colouring mixed pickles

Anthropology and Photography.—The letter of the Assistant General Secretary of the British Association printed in our columns last week should be read by every photographer who is something more than a photographer. The calling in of photography to aid in the science of anthropology is an idea of some value, and there is little doubt that the camera is capable of affording important assistance, as it has already done in the study of other sciences. A very elaborate work has already appeared in Germany on the subject—published in Hamburg, we believe—in which the author has included a vast series of photographic portraits, secured in different parts of the world. The British Association is desirous of doing for Great Britain in a systematic matter what the German author has done to the best of his ability in a general manner. The desire is for an "investigation by means of photographs of the national or local types of races prevailing in different parts of the United Kingdom; and the plan which the Anthropometric Committee have thought it best to adopt is "to select a number of districts in which it is believed a distinct type prevails, and in each such district to request the assistance of as many competent observers as can be found." It is obvious that in a study of this kind local photographers can render very valuable aid if they will, for if there is any marked human type in their neighbourhood, they must, perforce, possess specimens of it. The Committee ask that any photographer who has a desire to help them should forward from six to ten portraits representing in his opinion "the type chiefly prevalent among individuals belonging to families long settled and intermarrying in the district." And it is from the materials which the Committee thus hopes to receive from various parts of the country that they will select representative specimens. We have no doubt that many of our readers will be ready to help in the matter, and although we are hardly so sanguine of the result as the Anthropometric Committee appears to be, it is certainly an investigation that deserves to be undertaken. The Committee desires only the portraits of adults, and a proof of these and their grandparents having lived in the district is absolutely necessary. Before the introduction of railways there would have been less difficulty in finding long-resident families, and one might be disposed to say that it is a pity the effort now made had not been thought of a generation ago; but as photography was only then in its infancy, no very great aid could have been lent by the camera.

The Coming Total Eclipse.—Great preparations are being made for the observation of the approaching total eclipse. The phenomenon will not be observable in this country, and therefore those of our astronomers who desire to witness it can only do so abroad. Many will go to America, and among others Dr. Schuster, Mr. Lockyer, and Professor Thorpe, F.R.S., have expressed their determination to observe the eclipse. A special attempt will be made in the United States by Draper and Rutherfurd—names now familiar to every astronomer—to secure a picture of the corona on a larger scale than has hitherto been tried. A camera and lens have been purposely constructed for the undertaking, and there is little doubt that, under the supervision of two such experienced photographers, the most satisfactory results will be secured, provided, of course, the expedition is blessed with favourable weather. The corona, as our readers are aware, is the name given to that halo of light which appears round the sun at the time the disk is itself obscured by the moon, and it is only on the occasion of an eclipse that this corona and the flame-like protuberances around the sun can be satisfactorily seen and photographed. Professor Young, we believe, has been successful in securing some sort of a picture of the protuberances at ordinary times, but obviously the result can only be incomplete under such circumstances. Dr. Hermann Vogel, of Berlin, who is now a veteran observer, and experienced in the taking of eclipse pictures, does not take part, we believe, in the present expedition, a matter to be sincerely regretted, since our learned confrère is a thorough traveller, and is well acquainted with America into the bargain.

The Jablokhoff Light.—or electric candle, as it is called—is again attracting attention, and there is a rumour that it is to be tried in London. In Paris, the *Avenue de l'Opera* is already lit up by electric lamps as well as the Louvre Hotel and Magazin, and they seem to leave little to be desired. The only objection to the electric street lamps is that they are not high enough, and there is no doubt that the big globes of light would be far better placed twenty or thirty feet above the roadway. Piccadilly and Constitution Hill would appear very fine lighted up with electricity, instead of the rows of sickly yellow flames now to be seen on each side of the pavement. The main difficulty of its introduction into this country is the patent, for which it is said £350 000 is required for Great Britain alone. Hence the electric candle is virtually prohibited in this country.

COMPARATIVE COST OF PRODUCTION AND MARKETABLE VALUE OF CHROMOTYPE AND SILVER PRINTS.

BY M. LAMBERT.*

It is rather curious that though the opponents of carbon have always been willing and ready to discuss the relative cost of producing chromotypes and silver prints, none have yet endeavoured to write on the relative market value of the productions of the two contending schools of actinographic printing.

Having been repeatedly asked for my views on both these subjects, I will be as brief as possible, reviewing first the relative cost of production, and last the comparative money value of the prints obtained by both the permanent and evanescent systems, now contending for supremacy.

Out of 166 exhibitors at the Second Annual Exhibition of Permanent Prints, held in New York, December 20, 1877, 164 exhibited full gloss prints, proving that when it is no more expense, trouble, or time to give full gloss than plain prints, both the photographers and their customers prefer enamelled pictures. As none but silver prints with full enamel, to resemble chromotypes, can be compared in the cost of production of carbon prints, I will calculate in plain figures the actual cost of a dozen cabinet chromotypes and the cost of production of a dozen cabinet silver prints having the same finish, which necessitates enamelling.

Beginning at the beginning, I will say that as the cost of making a plain negative to print from, and the cost of the glue, starch or paste to mount the prints with in both processes are the same, honours are easy.

The cost of retouching a cabinet negative perfectly by the Lambert retouching and intensifying process for chromotype printing in New York, is 16 cents, inclusive of the necessary mineral paper and galvano-plastic powder. Retouching the same negative perfectly by the ordinary retouching and stippling processes, by the same retoucher, for silver printing costs $1. On an average, each cabinet negative will have an order of nine prints, thus making the cost of Lambert retouching for twelve cabinet chromotypes, 20 cents, and for the ordinary retouching for twelve cabinet silver prints, $1 25; and as the most disinterested authority on this subject I will give Mr. Waldack's, as expressed in a letter he sent to Mr. Landy, of Cincinnati, from Ghent, Belgium, in which he says:—"It is impossible, by any method of retouching, to do as much in four hours as can be done in one by the Lambertype method; his dodges and retouching are worth more than you will pay," &c.

It is claimed by the champions of silver printing that a sheet of best albumen paper, sensitized, toned, and fixed, costs 18 cents. A sheet of albumen paper is two-and-threequarter square feet, and will make eighteen cabinets, costing henceforth 12 cents for one dozen cabinet prints.

The best lithographed cabinet mounts, having the same consistence as a mounted chromotypes, costs $25 per 1,000, or for one dozen prints will cost 31 cents; or if the cheapest lithographed mounts at $12 per 1,000 are used, a dozen mounts will cost 14 cents.

The enamelling of twelve cabinet silver prints, so as to have the finish of a chromotype, costs in New York from $1 50 to $3—a firm specially doing the enamelling for the trade, as photographers generally had to give it up on account of its difficulties and uncertainties. I take the lowest price of $1 50 for enamelling twelve cabinet silver prints, so as to resemble in finish and brilliancy unenamelled chromotypes. I will not speak of the loss of four prints on every dozen usually allowed in the difficult, uncertain and tedious enamelling manipulation.

Recapitulation of the cost of one dozen enamelled cabinet silver prints from best retouched negative. Retouching, $1 25; sensitized paper, 12 cents; best litho. mounts, 31 cents, and enamelling, $1 50. Total, $3 18. Without enamelling, but then not to be compared with chromotypes, $1 68; without enamelling and on the cheap mounts, $1 54; without enamelling, on cheapest mounts and with retouching at same price as for chromotypes, 46 cents.

The price for chromotypes is as follows:—A roll of tissue is thirty square feet, equals in size eleven sheets of albumen paper, will produce seventeen and a-half dozen chromotype cabinets, and costs $3 25. To sensitize a roll of tissue it takes two ounces of bichromate of potash, costing 5 cents, so that thirty square feet of sensitized tissue costs $3 30, or for a dozen cabinet prints, 18½ cents.

A roll of transfer paper, 30 square feet, costs $1 20, making the cost for one dozen cabinet prints 7½ cents.

A quart of chromotype collodion and a pint of waxing solution cost, both together, $2, and will suffice to develop 11 rolls of tissue, making 220 dozen cabinet prints, making the cost for one dozen cabinet prints 2 cents.

Thin, plain cardboard, at $2 50 per 1,000 cabinet mounts, which, when mounted, will be as strong as the best mounts for silver prints, on account of the gelatine in the transfer paper, and as fine as the most expensive lithographed mounts, on account of the designs; address and name mechanically obtained by the self-registration process on the face of the print, costs for mounts for 12 cabinet chromotypes 2 cents.

Recapitulation of cost of one dozen full enamelled cabinet chromotypes from best retouched negative:—Retouching negative, 20 cents; cost of sensitized tissue, 18½ cents; transfer paper, 7½ cents; collodion and wax, 2 cents; mounts, 2 cents. Total, 50 cents.

For the sake of argument I will admit that the help required to work both carbon and silver is of the same skill, and consequently the same expense, though it is a well-known fact that cheaper help is required to print perfectly in carbon than in silver, as has been ascertained by Mr. T. C. Roche, of New York, Liébert of Paris, Braun of Dornach, and Autotype Company of London. I will, furthermore, suppose that the length of time required to finish pictures is the same for carbon as for silver, as also the time required by the Lambert process and the ordinary stippling method, though it is universally acknowledged and can be easily proved that carbon prints twice as quick as silver in dry, and three times quicker in damp weather and that retouching is ten times as quick by the Lambert as by the usual retouching system. Time is money. I will even admit that the results obtained by the contending processes, outside of permanency and beauty, are similar and as varied; though it is an indisputable fact that a variety of tones, colours, designs, lighting, combinations of matt and enamelled surfaces, mechanical polychromic effects, depth of shadows and brightness of whites, &c., not obtainable by the most skilled silver printers, can be obtained mechanically, free of extra cost, in chromotype printing.

Yet the price of producing chromotypes is less than the cost of producing silver prints possessing the same enamelled finish, on mounts of the same consistency, and with the same artistic designs and addresses, and from negatives retouched so as to give similar effects—the cost of silver prints being at least three times more than that of chromotypes. So much for the relative cost of carbon and silver prints.

Let us see now as to the relative marketable value of the productions of carbon and silver printing.

The want of space will not allow me to enumerate and discuss the very many advantages and qualities which must enhance the monetary value of chromotypes as compared with silver prints. I will only refer in this letter to three of them: permanence of results, truthfulness of proportions, and superiority and variety of effects

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* *Anthony's Photographic Bulletin.*

1st. Permanency of results creates the difference existing in the market value and price of two watches exactly alike in colour, design, beauty, and finish—one being of the time-tarnishing aluminium metal, whilst the other is of the permanently-bright substance so universally prized. On the same principle it follows that two prints exactly alike in colour, design, beauty, and finish, one being of time-tarnishing or evanescent constituents, and the other of the permanently-bright powders of the artist's palette, combined with the most permanent of all organic matter, gelatine, will also command two different marketable prices; and if the production of both is the same in cost, the results the same in beauty, and the same in price, it is natural and reasonable to expect that the public will demand and require the more lasting to the exclusion of the perishing kind of photographic prints.

Logical proofs of the permanency of carbon prints, and visible, tangible proofs of the evanescence of silver prints, are not wanting. The museums and libraries of Europe are full of illuminated vellum or parchment manuscripts dating as far back as the tenth century, some dating even to the fourth century, and yet those sheets of insolubilized gelatine written in pigments by the hand of man are not faded; sheets of insolubilized gelatine written in pigments by actinism, called chromotypes, will also stand the test of centuries; for similar materials employed in creating either a manuscript or a photo-script will essentially be of the same durability. A hand-cut stone ball will last just as long as a stone of the same material similarly rounded by the tools of nature—water and pebbles. Gelatine, hardened by its mixture with chromic acid, as done in the chromotype process, is made so indestructible by light, and unchangeable to air, heat, and humidity, that it is used for the manufacture of buttons, jewelry, &c.; whilst nothing in the world tarnishes quicker than silver, let it be in the shape of spoons or prints. Repeated experiments at the laboratory of the Massachusetts Agricultural College at Amherst, with Lambertype and chromotype tissues, under the personal observation of Professor Charles A. Crossmann, chemist, and H. L. Lovell, proved that the "carbon process is all it claims to be, and that none of the agencies which so readily destroy 'silver' prints have any deteriorating effects upon carbon prints."

2nd. *The truthfulness of proportions.*—It is a well-known and easily demonstrable fact that silver prints on albumen paper stretch in one direction and contract in another, according as the photograph is made lengthwise or breadthwise of the grain of the paper, while carbon prints are precisely identical with the negative, when subjected to the most delicate and mathematical measurement.

Silver prints are usually distorted, whilst chromotypes cannot possibly be. All good printers know of this failing of albumen prints, so much so that Mr. Pearsall, of Brooklyn, has applied for a patent for a method by which he claims distortion of silver prints can be avoided. Should this article fall under the notice of incredulous parties, they can soon ascertain this fact by the following easy little experiment. Cut one piece of sensitized albumen paper lengthwise, and another breadthwise, of the sheet; do the same from a roll of sensitized tissue, and print the four pieces of sensitized paper from the same negative. When these four prints are finished and mounted, measure the length and breadth of the head or face in the four prints, and in the negative: you will invariably and surely ascertain that in the silver print, cut lengthwise of the sheet of albumen paper, the head or face will be longer and thinner, or appearing leaner, whilst in the silver print cut on the breadth of albumen paper, the head or face will be shorter and broader, appearing fatter than in the negative, whilst both the chromotypes will be microscopically true to the negative, which does not lie.

Often a customer will remark that his face is pitifully elongated or unmercifully shortened, to which the operator usually answers: "The instrument can't lie!"—which is the truth, the whole abominable lying being done by the albumen paper.

3rd. *Superiority and variety of effects.*—An examination of the chromotypes and silver prints obtained from the same negatives, sent to the December New York Exhibition, sufficiently demonstrated the superiority of the former over the latter. Mr. Rockwood being granted the medal of excellency for his exhibit of chromotypes at the last American Institute Fair, shows conclusively that, even apart from the great, vital question of permanency, when silver and carbon meet face to face, young carbon has not to blush by being compared with his older silver brother.

The licencees whose interests are *pro* carbon and *con* silver exhibited both carbon and silver prints at the Second Annual Exhibition of New York, whilst the non-licencees, whose interests are *pro* silver and *con* carbon, failed to exhibit silver prints for comparison, though cordially invited to do so; thus both factions tacitly admitting their conviction that by comparison carbon carbon not be the loser.

The French, Belgium, Russian, and English Governments are now having their photographic work done exclusively in carbon, to the exclusion of silver. The British Museum, the Mint, the Patent Office, the Royal Arsenals of Woolwich and Portsmouth, the Royal Archæological, the Royal Art Association, &c., in England, as also the principal art, scientific, and literary institutions of Europe have given up silver and adopted carbon, and I have good reason to believe that the American Government will soon do the same. It will be admitted that these governments and learned institutions, who are usually very conservative, do not generally retrograde in their selections, and must have been practically, as well as theoretically, convinced that in changing from silver to carbon they were changing for the better. Having unlimited means at their command to order, and the intelligence, skill, and taste needed to judiciously choose, the very best, their verdict must be of some weight amongst the intelligent portion of the photographic fraternity.

The question of the relative cost of production of chromotypes by the combined Johnson and Lambert patents and silver prints being now settled by indisputable figures, the only question left open is: "Will the public willingly pay more for permanent, truthful, superior prints, than for evanescent, distorted, inferior ones; or will it, at equal prices, choose, and require, the former in preference, to the exclusion of the latter?" Europe answers, yes. The verdict of America is confidently expected now.

RECENT PHOTOGRAPHIC OBSERVATIONS OF THE SOLAR SURFACE.*

Experiments in taking photographs of the heavenly bodies have been carried on by different observers for many years, but more recently the laborious researches of M. Janssen, and the improved methods that he has introduced, have led to the discovery of facts and phenomena which were quite out of the range of former observations. Up to the present the best photographs of the sun have only given a faithful representation of the spots and facula on the sun's surface, whilst those which M. Janssen has succeeded in taking at Meudon have made us acquainted with a number of most interesting details. To understand the progress that has thus been made, it will be requisite to consider briefly the principles on which he has been working. If the solar image be viewed with the eye, notwithstanding the use of screen glasses and helioscopes, all the details of its surface will be seen as one brilliant mass. The relative intensities of the light of different parts of the image cannot be perceived, and the appearance, therefore, is not true to nature; there is a limit to the capability of our organ of sight. On the other hand, the photographic image, when it has been obtained under the correct conditions of the action of light, is free from these errors, and shows accurately the relative intensity of light from the various parts of the object. In order, however, to obtain such an image, it is necessary that while the light is acting the sensitive film should remain constant, that is, that the part of the sensitive substance which is acted on during the entire duration of the exposure should be only a small fraction of the total quantity present. When, therefore, the time of the action of light is measured so as to allow no over-exposure even in the lightest portions of the sun's disc, an image is obtained which shows not only the details in their true outlines, but also the proper porportion of intensity. On this account we must ascribe the successful results that have been obtained to the extremely short length of time during which the light was permitted to act. And besides the shortness of the exposure, which in summer time he has reduced to $\frac{1}{3000}$ part of a second, M. Janssen also adopts the plan of enlarging his pictures to dimensions which, by degrees, have been raised from fifteen to thirty centimetres, and by this means he has taken photographs whose examination has made possible new ideas of the constitution of the photosphere.

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* *Photographisches Mittheilungen.*

These photographs represent the surface of the sun as covered with a number of grains or granular elements. The forms, dimensions, and distribution of these granulations do not agree with the conceptions that had been formed from the optical examination of these elements of the photosphere. The photographs do not in any way confirm the notion that the photosphere consists of elements whose constant forms resemble willow-leaves, or grains of rice. Forms such as these are occasionally met with at different points of the solar surface, but their appearance is exceptional, and by no means such as to give expression to a general law on the constitution of the photospheric medium; the photographic pictures lead rather to a much simpler conception of the constitution of the photosphere.

If the granulation be observed at those points where it is most developed, it will be seen that the grains have very different forms, but all more or less related to that of a sphere. Where the elements are smaller, there they approach nearest to the spherical form. There are numerous grains having a more or less irregular shape, which it can be seen have been formed by the agglomeration of smaller grains whose form approaches that of the sphere. Even when the granulation appears to be less decided, and when the grains seem to have been drawn out into ovals with a long axis, it will be noticed that the sphere was in every case the original form, which has been more or less modified by the forces to which these bodies are subject. From the great variety of form exhibited by these elements, it further follows that they consist of a very mobile substance which yields easily to external action. It may, in fact, be advisable to assume that the granulations possess a constitution very analogous to that of our atmospheric cloud; that is, to consider them as bodies consisting of some rigid or fluid substance in a highly sub-divided state floating in a gaseous medium.

If the shell of gas forming the photosphere was in a state of rest and perfect equilibrium, it is clear that, owing to its fluidity, it would form a continuous envelope round the solar nucleus; the granular elements would coalesce, and the brightness of the sun would be equal over its whole surface. But the streams of gas rushing up from below prevent any such condition of perfect equilibrium; they tear asunder and divide the fluid layer into a number of pieces, and thus are formed the elements which are merely fragments of the photospheric envelope. These fragments tend to assume the spherical form, on account of the specific gravity of their constituents; hence the shape of a sphere which, as is well known, is adapted to a condition, not of absolute, but to one of relative equilibrium, wherein the photospheric substance that cannot settle down as a continuous envelope is divided into a number of elements, each of which tends to assume its form of equilibrium. But even this individval state of equilibrium is seldom realized; in numerous places the gas current sweeps away the granulated elements, and their spherical shape is altered until, if the movements be very strong, they become quite unrecognizable. These tides which keep in continual motion the layers of gas wherein the elements of the photosphere float, have themselves certain favourite seats of action, for the solar surface is divided into regions of relative action and rest. Besides which, even in the places of relative rest, the movements of the photospheric medium will not permit of the granular elements arranging themselves in level layers; as a consequence, more or less deep depressions of the grains beneath the upper surface take place, and, on account of the great absorbing power of the medium, there thus occurs that great difference in the brightness of different parts of the sun which can be detected in the photographs.

From the comparative infrequency of the brightest grains, we can also draw the deduction that the illuminating power of the sun resides more especially in a small number of points of its outer surface. In other words, if the solar surface were completely covered with nothing but the brightest of its granular elements, its illuminating power would be at a first approximation ten to twenty times greater than it is.

Lastly, we may learn that the facts now enumerated throw an important light on the so often-debated question of the variation in the illuminating power of the sun. It is clear that the spots can no longer be considered to be the principal sign of the oscillations to which the sun's envelope is liable; the variable number and illuminating power of the granular elements, which here play a most important part, must also be taken into consideration.

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ON REVERSING NEGATIVES.

BY A. SIGSON.*

The difficulty of taking in the same glass studio portraits which shall act as pendants to one another led me to entertain the idea of taking the negative off the glass plate, and reversing it. In doing this, I porceed in the following way:—

The negative is varnished and retouched, and then laid in water for a length of time which varies with the consistency of the varnish. When the latter (I use Schering's varnish much diluted with alcohol) is not very thin, and the plates are quite clean, it will take from one to two hours; but when a very thin varnish is used, it may be a whole day, or sometimes more, before the negative shows signs of separating; it may even be necessary to revarnish the plate. Should the varnish have a glassy texture, care must be taken not to leave the plate too long in water, as that may cause it to crack; in such a case, even half-an-hour may be quite sufficient to loosen the film. On other kinds of varnish I can offer no opinion, as I have had no experience of them.

As soon as the edges of the film show signs of separating, the negative is lifted out of the water and allowed to drain; a piece of ordinary writing-paper, which has previouly been floated on the water, is then placed on it, and the excess of water squeezed out. One of the corners of the paper is now raised with a knife, and the whole is drawn off with the hand, bringing the film with it. Should the film crumple in removing, it must, with its support, be again placed in water for a short time; for the crumpling is a sign that the film is not quite separated, and that there is a liability to tear. When the film has been removed, a piece of paper is wetted, placed on a plate, and the negative and its support, with the picture-side downwards, is laid upon it; the water is again squeesed out, and the upper paper is wetted and drawn off. A clean plate is now taken and coated with a thin solution of gum; the negative is also coated with this same solution, and laid upon the plate; the excess of gum-water is squeezed out, and the paper taken off. The result is a reversed negative. All the manipulation is very easy, and I have never yet had a failure. Though the varnished collodion film is of itself very strong, yet, from the fact of its being during the whole process in contact with a support, there is no occasion to fear its tearing.

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* *Photographische Mittheilungen.*

In the same way, in taking groups, any figures which may have moved can be transferred from other negatives. For this purpose a rough print is taken of that part of the negative or of the figure which it is wished to transfer, the negative is placed in water, and the print carefully cut out, not forgetting to cut clear of the outlines, as the paper will stretch, from the heat of the hand. The print is now fitted accurately on the figure of the negative to which it is to be transferred, scratched in with a needle, and the part of the film removed with a knife. The other negative is then taken out of the water, and the film removed in the manner above described, only taking care in this case to use strong paper; as this kind of paper is not so easily penetrated by water, it answers the purpose much better, and permits of the cutting out being more accurately executed. The figure on the film and the paper must be cut through in one cut, and if the operation takes a long time, both should be kept moist, to prevent the film from rolling up, owing to the heat of the hand. Just as in the former case, the part cut out must be treated with gum water, and if it is not found to fit, the parts should be marked with a needle, the film again removed and cut, or fitted once more; as soon as it adheres the paper is removed with a knife.

If the negative, thus arranged, is found not to possess everywhere the same density, its wrong side can be coated with flat varnish, which should then be removed at the denser spots. Generally a tolerably even negative can be prepared in this way, and from it a large number of prints can be taken without much trouble. Although, from the description, the process appears to be long and wearisome, in reality it does not require more work or care than a double, or in some cases treble, printing. At all events, the great difficulties that present themselves in copying where several prints are required, especially when the work has to be undertaken in the short and dark days, can by this method be avoided. If the operation of fitting the figures together has been carefully executed, no sharp contrast or want of gradation in the outlines will be observed.

In this way also groups may be arranged from several pictures, the backgrounds of landscapes may be transferred, and other artifices employed of a similar kind.

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REMOVING SPOTS FROM CLOTHS.

[The following recipes will often be found useful in the photographic operating room.]

Spots of Sugar, Glue, Blood, Albumen.—On white goods, on dyed tissues of cotton and wool, and on silk, simple washing with water.

Spots of Grease.—On white goods, soap water or alkalies; on dyed tissues of cotton, hot soap water. Ditto of wool, soap water or ammonia. On silk, benzine, ether, ammonia, magnesia, chalk, yolk of egg.

Colours of Varnish, Resins.—On white goods, and on dyed tissues of cotton and wool, turpentine, benzine, then soap. On silk, benzine, ether, soap; rub with care.

Stearine, Tallow.—On white goods, and on dyed tissues of cotton and wool, and on silk, alcohol at 95°.

Vegetable Colours, Wine and Fruit Stains, Red Ink.—On white goods, vapors of sulphurous acid; hot bleaching powder solution, weak. On dyed tissues of cotton and wool, wash with warm soap water, or ammonia. On silk, same; rub softly and carefully.

Alizarine Ink.—On white goods, tartaric acid; more concentrated as the spot is older. On dyed tissues of cotton and wool, weak solution of tartaric acid if the colour allows. On silk, same, with care.

Rust, Black Ink.—On white goods, warm solution of oxali acid; weak muriatic acid. On dyed tissues of cotton, repeated washings with citric acid if the colour is well dyed. Ditto of wool, same; weak muriatic acid if the wool is of the natural colour. On silk, no remedy.

Lime, Lyes, Alkalies.—On white goods, simple washing with water. On dyed tissues of cotton and wool, and on silk, weak nitric acid poured drop by drop, and rub with the finger the spot previously moistened.

Acids, Vinegar, Fruit Acids, Mould.—On white goods, washing with water or hot solution of bleaching powder, weak. On dyed tissues of cotton and wool, and on silk, ammonia, more or less weak, according to the tissue and the colour.

Tannins, Walnut Shell Stains.—On white goods, Javelle water; bleaching powder water; concentrated tartaric acid. On dyed tissues of cotton and wool, and on silk, chlorinated water more or less dilute, according to tissue and the colour, and alternately washing with water.

Tar, Waggon Grease.—On white goods, soap, turpentine, and jet of water alternately. On dyed tissues of cotton and wool, rub with pumice stone, then soap, then let stand; wash alternately with turpentine and water. On silk, same, but use benzine, and let a jet of water fall from a height upon the back of the spot.—*Scientific American.*

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THE ART OF DESIGN.

BY JAMES MARTIN.

Before concluding my observations on the "Art of Design," let us consider it as applied to out-door landscape portraiture. Photography is frequently blamed for the want of scientific knowledge in its professors, and a great many impossible and ridiculous representations of natural objects are produced by using improper lenses and apparatus. It should be recollected that all pictures are subject to the criticism of the human eye, and must be judged by that organ. Therefore, unless they agree in proportion and perspective with the laws of vision, they will be pronounced ridiculous. The most common error of beginners is a wish to obtain a greater angle of view than corresponds with the human eye. Where this is desirable it is better to take the picture in sections, than to use a lens which will distort the whole. A camera intended for landscape work should, I consider, have a small cirular level inserted in the upper side of its body, thus enabling the most ignorant operator to bring it quickly to a truly horizontal position. A picture is supposed to be such a space as can be seen by the eye at one glance, and this space is generally suposed to be about fifteen feet high by about twenty-three feet long, or, we will say, in proportion of two by three. Such an opening must be placed at a certain distance from the eye, so that its two sides correspond with the angle division. Thus, it will be found that the greater the scale the picture is painted upon, the longer the distance the observer must stand from it to be able to see it at one glance. It will also be found that about the first twenty feet of distance, can art be introduced into the picture. Extended scenes are the most answered for, photographic in production, unless there should be some bold and striking object in the foreground. As the guard of portraiture (the space which the picture is supposed to comprise) is much less than that of landscape—for a full length figure generally about nine feet by five feet—other proportions are governed by the position of the figure, and whether merely a head or bust of three-quarters length are to be included.

I consider it a great mistake to use scenic backgrounds in studios; as a perspective it can never agree without other figures, unless this is always placed at one point, and the camera also at one distance from it, and the background must have been painted to suit this purpose. Interiors are much more suitable than landscape painting; accessories are always failures, as the lights and shadows given to these can seldom or ever correspond with that of the figure; therefore I should conclude with the least black hair, for studio practice is a plain one; but, I think that a great deal more might be done to produce artistic effects than at present—a system of lighting the studio so as to be independent of the general light of the studio, and entirely shut off from it.

The Photographic News.

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RAPID EXPOSURES.

Preliminary and Supplementary Light.

Amongst the varied suggestions for reducing exposure, there is none, perhaps, mere excellent than that for exposing part of the time with the full aperture of a rapid lens, and part with a stop. Where the subject will permit of the use of a lens of very short focus and very wide aperture, the ordinary wet process will, in a good light, give very rapid results. In ordinary portraiture, however, the definition would be very unsatisfactory if such a lens were used, depth of definition especially being wanting. A satisfactory compromise may, however, be effected by the method to which we have referred. Assuming that with a rapid lens stopped down sufficiently to give good definition, an exposure of twenty seconds be required to secure a good negative, the exposure might be reduced to one half that time by giving (say) eight seconds with the stop, and two seconds with full aperture. When this method was first proposed, it commended itself to our approval, and subsequent personal experience, and reports from others, have confirmed our idea of its excellence. The quality of the negative it yields is singularly pleasing. The crisp definition secured by the use of the stop is tempered by the effect of the exposure with full aperture which softens the sharp lines, with an effect somewhat like that obtained by the use of a badger tool softener in oil painting, giving a harmonious artistic quality to the definition generally. The method is one which, we think, deserves more attention than it has hitherto received.

The supplementary use of diffused light has received considerable attention of late, as a means of shortening the sitting, and, where it has been fairly tried, it has generally been found valuable. It is very curious, however, to note that whilst the idea of shortening exposures by the use of diffused light is one of the oldest in connection with the subject, it still remains amongst the doubtful or disputed theories upon which no general decision has been made or accepted. This is the more remarkable, that in the early days of photographic portraiture the value of diffused light was recognized as a practical fact, and not a merely theoretical idea. Old Daguerreotypists will remember well its use. If the light were dull, and a rapid exposure were desired—or, indeed, in any state of the light if a baby had to be taken—the excited plate was exposed for a moment to diffused light before placing in the dark slide, and with invariably satisfactory results. With the introduction of the collodion process this practice seemed to pass out of use, banished by the assumed greater sensitiveness of the materials and the horror of fog which every collodion worker acquires early in his practice. Various attempts have been made to revive the practice, and different modes proposed of making diffused light available. Somewhat more than ten years ago a patent was obtained in America and this country by an old portraitist, Mr. F. B. Gage, for a method of "harmonizing the lights and shadows of pictures." This consisted in exposing an under-exposed plate to the dim light reflected from a piece of black cloth, which was kept in motion to avoid image of its texture. Some time after that Mr. Blair, of Perth, an amateur of rare ingenuity and intelligence, without any knowledge of what had been done, communicated an exceedingly interesting article to our columns making a similar suggestion; the admission of a regulated quantity of actinic light into the dark-room being especially mentioned as an efficient method of applying the principle. Mr. Blair's view of the matter was similar to that which we have always held; namely, that the auxiliary action of diffused light should be preliminary to exposure. As we have before explained, the principle upon which diffused light can be utilized without causing fog is this: with the degree of sensitiveness possessed by ordinary wet collodion plates, a certain amount of light may fall upon the surface without producing a developable effect, whilst a fraction more will produce an effect which may be developed clearly enough. Assume that light consists of so many units; it may require three of these to produce an effect on the sensitive plate which will admit of development. In that case, two units would produce no developable effect at all. Apply this to the production of a picture; if the plate have received two units exposure to diffused light before exposure in the camera, it will require these two units less in the camera, and will still yield an harmonious and brilliant image. To repeat a mechanical illustration which we have before used, it is well known that more force is required to put a body at rest into motion, than is required to keep it in motion when once started. The first push, so to speak, which is to place the molecules of the sensitive surface into action, is given by diffused light, whilst the continuing force which determines the direction and degree of action is given by the camera image. Rightly understood and applied with skill and judgment, we cannot doubt that an invaluable accelerating power exists in the use of auxiliary light first applied to the sensitive surface.

Many methods have been devised for applying this auxiliary light, and it is difficult to say which is the best. There can be no doubt that the method which places the amount of light most under control of the operator is best; but which method really best secures that control we do not at present undertake to decide. The early method of lining the camera with white, it is clear, does not give any regulating control to the operator, the same action being always in operation. The admission of light into the dark room in any regulated degree would be difficult except by such a plan as that adopted and described by Mr. Tulley, as follows:—The dark room window consists of three panes of yellow glass, each a little deeper than the other; the whole being together perfectly adiactinic. By opening one of the frames, a minute trace of actinic light passes through the glass; and by opening the second an increased proportion of light was secured. Mr. Tulley found that on developing plates with one or both the frames open, under-exposed plates gradually yielded good negatives. Another method of securing a measured amount of light has been suggested, consisting in the use of a gas flame behind opal or ground glass. Mr. Gage's method was, as we have said, to expose the plate to a piece of black cloth or velvet. A hasty exposure to the diffused light of a window has been tried; whilst some expose for a few seconds to the background. The use of a cap for the lens with an aperture fitted with purple glass, or purple paper, as proposed by Signor Scotellari, has been found valuable by many. But, probably, no method has been found more generally useful, than that in which a lens cap is used containing opal glass, through which the light is suffered to reach the plate. This plan has been tried by many who speak highly of the results.

CHIAROSCURO IN PORTRAITURE.

BY WM. HEIGHWAY.

We are all of us trammelled with the nonsense of our early teachers, and the prejudices they endowed us with. We have had a hard struggle to tear ourselves from the old blank map kind of portraiture, and come to recognize the part chiaroscuro plays in photography.

The tendency in our mode of lighting has been to the production of harsh patches of whites and darks; this has gone somewhat out of vogue, it is true, but the insipidity of the great bulk of every-day photography is almost equally wrong.

We have now enough half-tone and delicacy for anything—enough, at any rate, to destroy character, kill likeness, and in its dreary sameness to "make the whole world kin." Why, everybody might be everybody else's brother, so great is the family likeness of photographs.

The great aim of photographers should be to use light and shade to develop character, not to destroy it. This soft, delicate picture may be, under a miserably mistaken idea of beauty, very nice and pretty—but it is not Art.

The highest compliment you can pay Nature, if you are so desperately anxious to be complimentary, is to be truthful. All this prettiness and unmeaning niceness in pictures is not doing justice to the beauty of character, and is as false as it would be to paint an apple like a peach.

Let your lighting of the head be directed to the reproduction of the character, and to the attainment of roundness, and, to a certain degree, relief.

Generally speaking, photographers are afraid of shadow. They may not acknowledge it, they may even be able to point to many shadow effects in refutation of the charge, yet the evidence of the mass of photographs either proves that photographers do not know the power of skilfully produced darks, or they do not care in general to utilize the power.

It is rather in the *quality* of the black than the quantity, that the deficiency is apparent. There should be dark places as conspicuously distinct from the graduated shadows as the high lights separate themselves from the lights.

Place a sitter in the ordinary place in your studio. (The floor is quite worn there, you know, because all the sitters you have had since ever you opened your gallery have just been posed on that one spot!) Now study the effect of the light on that face. Nine-tenths of your pictures have been of heads three-quarter view, with the camera parallel to the window, so that you get a nice blaze of light on the side nearest the window, and on the shadow side darks about as flat as they well can be.

Let us see the effect of arrangement of the blinds (you generally keep open) by drawing down that farthest from the sitter. The high lights on the forehead and the nose, and other minor lights, are now seen in their perfection, and of course all gradations of shadow down to a perfect black are produced, and the entire face receives its proper amount of relief. Thus very briefly with one simple experiment on the power of shading.

You may, without much trouble, extend your researches in this direction, and study the question of the best mode of lighting each face; for it is not sufficient to get variety in this respect, unless it is intelligently adapted to the requirements of each model.

There is a deeply-rooted superstition among photographers that to exclude light in the manner indicated tends to lengthen the time of exposure; but experience points to the fact that a properly-illuminated figure requires no longer exposure than one on which the full blaze of available light is cast. Here, again, it is a question of quality, not quantity.

It is also a great mistake to suppose that distance from the light secures softness of tone—poverty of lights and darks is the only quality induced. To seat the model far away under the boarded-up roof can only make the picture harsh in contrast and poor in tone.

Shut out as much light as necessary, but let the little you have be of good quality.

In placing the camera on the dark side of the studio, and thus working diagonally across the studio, you secure the shadows in all their beauty; you also get the lights in all their pearly splendour. How different in result is this treatment to seating the model far apart from the light! In one you get rich tones, from pure black to the most brilliant touch of delicious white, with all middle tones delineated—a perfect modelling of the face; and in the other hard, flat shadows, and light of unsympathetic blankness without roundness or relief.

The delicate features of women and children require a treatment more delicate; but even here our softness must not be of poorness of tone, but the restraint of power. Preserve the roundness, and render to the full every sweetly tender undulation of the form. Here, too, we must not be afraid of the darks.

If you will only take care of the shadows, to get them of true value, there need be no place for anxiety on account of the lights.

PHOTOGRAPHING WHEN AWAY FROM HOME.

BY DR. J. SCHNAUSS*

Among the least agreeable of the experiences in the practice of a photographer have always been the attempts to take pictures at such a distance from the studio that the plate becomes dry before it can be used; even a collodion extremely rich in alcohol, and a backing of wet paper behind the plate, will not ensure its keeping moist. This difficulty will be found to increase when the exposure is in a dark interior, and therefore requires to be a long one. From the time that the collodion process was first adopted, it has always been a desideratum to maintain the sensitive property of the silver film in its wet state for hours, and even days. Unfortunately, difficulties were met with which, in the former days of Daguerreotypes and albumenized silver plates, were unknown. Even dry sensitive negative papers could be manipulated with greater certainty than collodion plates in a half or quite dry state. At first, as also of late years, a means was sought for of keeping the plate moist for some hours, and it cannot be denied that such a process, if it were certain, would find a more frequent employment than that of the troublesome and unreliable preparation of quite dry plates—at least, before the invention of the bromide emulsion which is now so much in vogue.

For preserving the moisture of the silvered plates, hygroscopic substances were commonly added to the bath; or certain solutions, as, for example, those of zinc nitrate; and later, of magnesium nitrate, were, according to the prescriptions of Spiller and Crookes, flowed over the plate. With the latter salt I have myself obtained very good pictures. When its properties became better known, glycerine also was tried, and the opinion pronounced on it is that in practised hands it gives sure results; but with the less skilled operator it always causes fogging. It may, perhaps, be advisable to give some hints, to which attention should be paid in order to obtain successful results when using this substance. In the first place, the glycerine must be chemically pure, and particularly, it should not become cloudy when decomposed with a few drops of silver nitrate. When the glycerine has been obtained as a by-product in the manufacture of soap, it often contains chlorine, for the soap is precipitated from a dilute solution of glycerine by means of common salt. Glycerine is also obtained as a by-product in the preparation of sticking plaster, that is, when the

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**Photographisches Archiv.*

finer fatty oils are heated with litharge and water. In its purest form, however, it is produced by the action of superheated steam on fats (which are the salts of the fatty acids and glycerine) in order to obtain the pure stearic acid. All these solutions of glycerine must first be concentrated by evaporation. I have found it advantageous, before using the glycerine for photographic purposes, even when it is chemically pure, to decompose it with a couple of drops of silver solution, and to expose it for some hours to sunlight. Almost always, though it will not turn cloudy, a reddish discolouration will be perceived, which finally disappears, leaving a slight deposit of reduced silver. It must then be diluted with from five to six times its amount of distilled water, in which a quantity (about 1·18) of silver nitrate has been dissolved; and lastly, have some acetic or citric acid added to it. The more acid there is, the greater is the loss of sensitiveness, but the less is fogging to be anticipated.

This solution, after being well filtered, is then poured, several times in succession, on the plate at the moment of its being removed from the silver bath; it is made to flow evenly over the whole plate, and more especially at the edges, which are always the first to get dry. As a matter of course, the plate must be touched with hands and fingers which are perfectly clean, or, what is still better, a holder should be used; the least impurity causes large black spots, which spread from the edge over the whole plate. The plate will keep moist in the box for two or three hours, but it will be found advisable to lay a few clean sheets of damp blotting-paper behind it. Before developing, all the glycerine must be removed by plunging the plate into distilled water, and carefully washing it; it is then immersed in the original, or, better still, in a fresh bath rather dilute and slightly acidulated, and is developed with the iron solution, which, however, must not be too strong.

Notwithstanding these precautions, however, there will be many who will meet with greater difficulties in obtaining clean plates with glycerine, and to such I would recommend, from my own conviction and experience, the employment of a second silver bath; this should be much diluted (to the strength of about one in fifty), and slightly acidulated with nitric acid. As soon as the plate has been silvered in the usual way, it must be laid with the collodion film upwards in a pan containing this second silver bath, and moved about in it so as to rinse the film well. It must then be drained, placed in the box, and covered on the reverse side with several sheets of damp blotting-paper. The time of exposure need not be longer than with an ordinary plate; the plate will keep wet for about two hours in warm weather. Before developing, the plate is dipped several times into an ordinary strong silver bath, and allowed to drain. The negatives obtained by this method are excellent, and often better than those taken with a silver bath; there is no symptom of fog. It is best to use a somewhat thick collodion, and one which contains an excess of alcohol. On long excursions, this process can be modified so as to develop the plate on the spot, by making use of any suitable place (such as a cellar or cave) that happens to be in the neighbourhood as a dark chamber; for this purpose, all that is required is a small pocket lantern, a small bottle of developing solution (one with a wide mouth is best), some solution of silver, and a pocket-flask full of water. The developer must first be flowed over the plate, and if the image appear too weak, it can easily be intensified by the addition of a little silver solution; afterwards the plate is rinsed as well as circumstances will permit, even if it be merely superficially. It is then returned to the box, when it is kept protected from the light until the arrival at home, when the washing can be completed, and the image can be fixed. If it be desired to carry out all the operations of sensitizing, developing, and fixing at the place where the negative is taken, much more baggage and less portable apparatus will be required. According to my own experience, the photographic image must be intensified on the spot, or it must be developed and fixed at the place where it was taken; in the latter case, it is best fixed by means of potassium cyanide, and afterwards it must be intensified at home with pyrogallic acid and silver. A plate only weakly developed, and not fixed, has always with me become spotty at the after-intensification, when it has to a certain extent grown dry.

There are, of course, a large number of arrangements for providing a portable dark room, from the camera itself, the interior of which can be made to serve as a dark room for smaller plates, up to the carriage drawn by one or two horses, which contains every requirement for the negative process, and permits of the work being most conveniently carried on, though not so well adapted for mountain excursions. For the latter purpose, a portable tent that can be folded into the knapsack will be found to be most serviceable; it must, however, be provided with stays or some other arrangement which will save the operator in the midst of his work from being deprived of all shelter by a sudden gust of wind.

As regards the later operations, there is no occasion to give any detailed instructions, as they are exactly the same as those that are undertaken in the studio. To avoid the necessity of having to use a large quantity of wash-water, the operation of fixing may be carried out at home. All the plates must be kept and transported in well closed boxes. Should the operator have cause to fear the penetration of light (though with ordinary care this can scarcely occur) he should flow over the plate, after the developing—or, rather, the intensifying—solution has been washed off, but before the fixing solution has been used, a dilute solution of glycerine to which a little potassium iodide has been added; plates treated in this way before fixing are perfectly insensitive. Allowing the film to get dry would be injurious in more ways than one, but this the glycerine tends to prevent.

Anyone, however, who wishes to become a landscape photographer with the least possible trouble, while deriving great enjoyment from his work, should get one of the folding cameras of Messrs. Liesegang, of Dusseldorf, and use dry plates prepared with silver bromide emulsion. These cameras are most ingeniously constructed, and exceedingly portable. Up to the cabinet size they are so highly, even elegantly finished, that when folded up they are more like a lady's workbox, and no lady would hesitate to carry one about herself. The camera screws on to a stand which folds up and forms a light black staff resembling an Alpenstock, while the two dry plate boxes, each of which holds at least two plates, can be easily carried in the pocket. Next in size there is a rather larger camera which is so arranged as to give room inside for twelve dry plates, and these can readily be changed without any further precaution being necessary. Both these pieces of apparatus I have tried, and found them to answer fully the expectations I had been led to entertain of them.

A CHAT ABOUT AN OLD DRY PLATE.

BY J. O. MERRILL.[*]

One of our subscribers has sent us quite a curiosity in its way, namely, a print from a tannin dry plate, exposed seven years after it had been prepared.

The picture, in detail and general quality, is quite as good as much of the "dry" work we have seen from freshly prepared plates, and rather tends to subvert the theories of those who have always held that "dry plates won't keep." Our correspondent gives us a detailed history of this old dry plate, which is so interesting that we append it.

"Yours of the 16th inst. received; will send photograph to-day. You will observe that this picture is of dark or variegated marble. It was made about four weeks ago; there was some snow at the time.

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[*] *Philadelphia Photographer.*

"These plates were coated seven years ago the first week in April. They were the first and only dry-plate work I have done, until quite recently. They are 11 by 14 in size, and have been very much misused—that is, they have been exposed to light at different times. About eight months ago I wanted some 11 by 14 plates, and opened this box in my room, about ten in the forenoon; the light was quite sunny at the time. I found them in such good condition that I forebore to clean them off, and have kept them; and this work I send you is made from one of those plates.

"When the plates were coated, the formula of Chas. W. Hull was followed to the letter. Of course, you will agree, any new process wants some practice before one can expect in any way to perfectly work it. But I did not experiment with it; only coated as above stated, and worked it with very good success. This plate had an exposure of ten minutes with 1-4 inch opening, a view tube I purchased of Chapman and Wilcox some twelve years ago; it is half size. The development was just as easy as the wet process, the plate developing quite as free and as rapidly. The developer was made and used as per formula, at least as near it as possible. Of course I did not prepare so much in quantity as formula. but as much as I needed for one plate, but in due proportion to formula.

"The negative is a rapid printer in the sun. We have printed upwards of a hundred prints from it. The one I send is pretty strong. If I had used glasses to focus with, I should have succeeded in getting it a little sharper; but I forgot them, and my eyes are somewhat impaired by hard usage, as I have to use them in focussing, in retouching, spotting, reading, and writing. Let me have a furlough of a few weeks outside, and I can see about as well as ever. This retouching is terrible for the eyes and nerves.

"This formula was published in your journal in 1867, Vol. 4, No. 37, page 36 When my plate developed so readily I was more than astonished, as I have read so much *pro* and *con* about the dry process and the keeping qualities of dry plates. In view of the many questionable points about the dry plate process, and the difficulties of working it successfully, and so many different agencies in different formulæ, and the length of time these plates have been coated, and the different exposures to light, you may think it would astonish the most successful dry workers. I thought the subject worthy of notice; perhaps it would call out something advantageous to the fraternity if it could be published and commented on by some more experienced in that line of work."

STRAY THOUGHTS FROM THE ANTIPODES.

BY AN OLD CORRESPONDENT.

The paradoxes that we have read from time to time must make old men like myself stand aghast, tending to make us believe that the photographic world is turning topsy-turvy, and that we are drifting into chaos. Starting from our infantile working, when every operation in the dark room was conducted with the faintest glimmer of non-actinic light, I think the first innovation promulgated was that of the late Antoine Claudet, who proposed that the exposure of the plate (Daguerreotype) to the light and to the mercurial vapour for the development of the image should be simultaneous. Another, some years after (the proposer's name has escaped my memory) was that the camera interior, instead of being blackened, should be lined with pure white paper. Of late years, we have the collodionized to be exposed to the light before and after receiving the image, in order to reduce the time of exposure; and each theory has its champions. And now I think the culmination has come to pass by a daring innovator, who proposes, as the best way to make paper prints permanent, to leave them charged with a good dash of hypo, and this after so many years of anxious toil and thought by numerous clever men for the best means to eliminate that poisonous compound from the prints, and make them a thing of beauty and a joy for ever. If our present neophytes try to digest the many books and journals that have been written in the advancement of the art, they will surely say that although "in a multitude of councillors there is wisdom," yet "too many cooks surely spoil the broth."

With regard to the accellerating the exposure by light, it might be worth while to try the following. Instead of having a metallic diaphragm stop, to substitute one made of thin blue *pot-metal* glass ground on the posterior side, and of course with the usual central opening.

Mr. Edwards, in the Year Book, says: "The bath is best when fully saturated with iodide;" and that "it is not possible to over-iodize a bath." Every one must have noticed that there is a time when the bath is at its best working state, and this, I take it, is that time when the collodion, the strength of silver solution, and sensitising baths are peculiarly balanced to each other. Has he never had a bath which gives that sandy deposit indicative of surplus iodine? It is true that a given strength of pure nitrate of silver solution will only combine with a certain quantity of iodizer, but as a nitrate bath in the course of working becomes contaminated with alcohol and ether, and as both those spirits are greater solvents of iodine than water, I think it follows and is self-evident that a bath does become *over-iodized.*

Correspondence.

"WASTE NOT, WANT NOT."

Dear Sir,—The above aphorism is particularly applicable to photographic operations. Waste when handling solutions of the precious metals will soon bring want, and the larger the establishment the sooner will this calamity be produced. For the purpose of showing that nothing which has been imbued with such solutions should be thrown away—at any rate, without testing their value—I will relate an incident which lately occurred to me. When breaking up my establishment at Ilfracombe, there were, amongst other photographic *debris*, two casks. One of them, of large dimensions, had, in fact, been originally a sugar hogshead; the other, of about thirty gallons capacity, had contained bilburys; there was also a wooden pail. The casks, upon examination, proved to be somewhat rotten, particularly in the middle part of their sides. The pail was as sound as ever, most likely because it was made of oak. These articles had been used to collect and hold waste solutions. Being saturated with poisonous matter, they were dangerous and worthless for sale.

The idea occurred to me whether there might not be a portion of silver absorbed in the substance of the wood, and, if so, it might prove of sufficient value to pay for refining. At any rate, I determined to try the experiment. Having had my sitting room fire-place cleared from all extraneous matter, and having had the casks chopped up into conveniently sized pieces, I commenced burning them. There was sufficient wood to keep up a good fire for five days. The ashes produced were about half a bushel; and as some of the wood was very imperfectly consumed, and the whole was too bulky to pay to send in that state, I took a small iron pot, such as is used to melt lead, pitch, &c. Placing it on the fire, I filled it, and refilled it from time to time as the ashes shrunk away. I made them red hot, and thus reduced them to about three pints of ashes, which were, for their bulk, very heavy. In this state I forwarded them to the refiners, stating that I was interested in the amount of metal that they might produce, and also explaining the origin. In due time I received a circumstantial statement, with apost office order; after paying all expenses, there was a balance amounting to about three pounds. Here was a little mine of wealth, produced out of things which might have been considered utterly worthless, even for fuel; therefore I need hardly repeat the caution, the words of which I use for the title of this paper.

Perhaps my experience in throwing down these residue may prove of service to beginners. Along one side of my dark room was placed a wooden trough in a somewhat sloping position towards one end, which terminated with a pipe leading through the wall of the room to the large cask placed outside, and thus carried off whatever was thrown into it, and much contributed to lessen the effluvia of the chemicals used outside. For some time I used sulphuret of potassium to disengage the silver from its solutions, but although it was a completely exhaustive process, I found it expensive, and the liquid was left in a turbid state, and required some considerable time to deposit its sediment. I then tried sheets of copper. These required to be frequently cleaned, and performed their work very imperfectly. I frequently cleared the liquid from its sediment by throwing into it some powdered alum; but none of these methods satisfied me. I changed my course, procuring some pieces of scrap zinc; by interlacing them together I formed two large zinc plates, and suspended them in a cask, adding from time to time as much muriatic acid as kept the solution in an acid condition. I found this answer well, always taking care to test the liquid before running it off the sediment. I certainly consider that of all the methods I have tried, this has proved the best.

It perhaps may be of service to state that photographic residues, except chloride of silver, should be so thoroughly burnt as to leave nothing more than oxide of silver and charcoal, which can only be done by making the ashes red hot, either in a crucible or the iron pot before mentioned. The refiner charges so much per pound for the quantity sent, as he is obliged to use a certain quantity of flux to each pound of ashes; therefore, if these are unnecessarily bulky and weighty, the expense both of carriage and cost of reduction will be considerably increased, and the nett profits lessened in proportion.—I am, dear sir, yours truly,

J. Martin.

122, *Queen's Street, Newton Abbot, Devon.*

PRICE OF PORTRAIST.

Dear Sir,—Lately I have been thinking that eight well-finished cabinet photographs seemed too many to give my patrons for one guinea. Judge my surprise when a gentleman showed me twelve cabinet photographs he had just had done in Regent Street for a guinea.

I advised him to get all his friends done there quickly before a collapse took place.—Yours truly, Photo.

Proceedings of Societies.

Photographic Section of the American Institute.

A meeting was held on May 7th, 1878, President Newton in the chair. The minutes of last meeting were read by the Secretary, and confirmed.

The President said: I stated at the last meeting that I would show some emulsion portrait work at this meeting. I intended to have gone into some portrait galleries where I could have an opportunity of seeing the work done under a different light from my own; but I only had one, that of Mr. S. A. Thomas, Forty-first Street, and Sixth Avenue, and I here exhibit a print from a negative there made by an exposure of two seconds. You will see that ample time was given. I also exhibit negatives made at my own gallery with exposures of six and eight seconds—not more than one-fourth the time required by the bath process—and prints from the same.

The negatives and prints were very fine, and elicited much praise from those present.

The President, continuing, said: I have here a four by four negative, in the making of which I used Mr. Willis' oxalate of potash and ferrous oxalate developer; also prints from the negative. I experimented a very little with it through the last summer and fall. I also experimented with the oxalate of ammonia and soda, and got pictures with all of them, but much the best with the oxalate of potash. Until recently I had not given much attention to it, being engaged in other experiments; but within the last few months I have simplified it very much—that is what I try to do with every process, so as to make it generally practicable. Now with my emulsion I have aimed, after producing satisfactory results, to simplify it down to a point which makes it practicable and accessible to anybody in the business. The plate [exhibiting] was developed with the neutral oxalate of potash and ferrous oxalate, acidified with citric acid just sufficient to turn litmus paper red. The neutral oxalate was nearly a saturated solution. To that I added fifteen grains to the ounce of pulverized protosulphate of iron. My object was to get rid of that part of the process which required the manufacture of the ferrous oxalate as a separate salt. In these experiments I varied the quantity of iron from five to thirty-five grains to the ounce; but you gain nothing beyond saturation; the ferrous oxalate precipitates after the solution is saturated. I found that fifteen grains would readily dissolve in the oxalate solution of the strength given. Such was the developer with which this negative was made; it speaks for itself. It was slightly strengthened with the ordinary acid pyro. and silver, and a more perfect negative is rarely seen.

Mr. Duchochois: Do you find any difference in time of exposure between the soda and ferrous oxalate developer?

Mr. Newton: I found that with the solution prepared in that way no longer exposure was necessary than with my carbonate of soda developer.

Mr. Chapman: Did you find any advantage in using that instead of the soda?

Mr. Newton: I was trying it, as I try any new thing, to see what there was in it. After I had satisfied my mind that it was a good developer, or might be made so, or that it promised to be something of value to photographers, then I went to work to see how far it could be simplified and made more efficient. It is better than I have before made with any modification of this developer. As to the advantages, if any. In the first place, this developer can be used over and over, with the same effect, until it is considerably weakened; add a little more iron to it, and its vigour is restored. A plate cannot be fogged with it if the solution is acid. That is my experience. It promises fair to be the developer of the future for this class of work. After making it in various ways, I find that that stated at a prior meeting was the most simple, and attended with the least trouble, which was to make a saturated solution of carbonate of potash in water (take what is called salts of tartar), and to that add oxalic acid in crystals. Of course, as soon as the oxalic acid comes in contact with the potash solution, carbonic acid is evolved so rapidly that it keeps the crystals afloat on the surface; they are soon dissipated, all dissolved. When it becomes saturated, some of the oxalate of potash is precipitated, and the natant liquor is a saturated solution which may be diluted as required. This developer was acidified with citric acid. I found by further experiment, however, that this extra trouble of acidifying at this point of the process could be avoided by making the oxalate of potash, when compounded, slightly acid with oxalic acid.

Dr. Nicol, of Edinburgh, was introduced to the Section by the President with appropriate remarks in reference to his connection with the photographic press.

Mr. Gardener: I have had some little curiosity to know whether Mr. Newton's process was all that it purported to be. I visited his gallery for that purpose, and saw some of his pictures that we have been looking at here this evening; and several negatives were made, and, while I was there, one of myself. As he has stated, his skylight is very small, and, at the time, the sun was coming in on one portion of it; consequently I had to sit in the back part of the room, where, to my eye, it looked as though it might require thirty or forty seconds, at least—by any wet process, any way—to get pictures. Mr. Newton made a picture in about six seconds. I also examined a number of negatives, and saw they were remarkably smooth, that is not apparent in bath plates; and, I must say, I was somewhat converted to the emulsion process. So I wrote this paper with the intention and purpose that, if I am mistaken in my judgment, I may be corrected. I say that the specimens of emulsion pictures here exhibited are, in my judgment, conclusive proof that this method of working will produce as good results as any of the processes now in use where negatives are made by means of the silver bath. And it has a number of advantages over any of the bath processes. In the first place, it is less expensive, for it does away with the use of about four-fifths of the nitrate of silver commonly used in photographic galleries. In the next place, it is not so liable to fluctuations—for every plate used in a negative bath reduces its strength, modifies its working condition—and the constant tendency is to uniform results. Besides, with the bath, to keep it in anything like working order, it has to be frequently clarified and strengthened; and to do this successfully, no small amount of time and expert patience is required. Another advantage is that it does away with the retouching of negatives, and this is one of the most expensive items of negative making. Another advantage is its sensitiveness to light. With the emulsion process more negatives can be made in a day than can possibly be made by the old methods of working, for the time of exposure is reduced from one-third to a half of the time necessary for bath plates. For out-door work it requires less luggage, and is more certain in its results, as it admits of a greater latitude in the exposures, and is more under control in the development of the negative. Now, with all these advantages, viz., its less sensisiveness, its greater certainty and uniformity of results, its saving of time and labour, its shortness of exposure, and the small amount of luggage required in practising out-door photography—with all these advantages, I say, you would naturally think that every photographer would at once sell his bath to the silver refiner, and abandon for ever his old methods of working. But you make a great mistake if you think so. And for the reasons, perhaps, that you do not take into account the power of habit, the influence of prejudice, the disposition to scepticism, and the dread and labour of learning anything new that requires an outlay of both time and money. The great advantage, therefore, to be derived from the emulsion process will no doubt be reaped by those who are yet to learn photography, and who can learn the use of emulsions quite as easily as that of the silver bath. The emulsion process has, no doubt, a long lease to run, and in the end will come out the victor. And if spirits be permitted to see the progress of mortals, our President will no doubt behold with delight, in the vista of the future, the fruits of his persevering and eminently-philanthropic labours.

Mr. Chapman: You might say that it does away in a great measure with the retouching, but not entirely.

Dr. Nicol addressed some remarks to the Section, in the course of which he said:—"There is no doubt that the most of us workers have derived a great deal of benefit from Mr. Newton's emulsion. I have tried almost every modification, and my opinion is at the present moment that it is the best emulsion—you can get the most reliable plates. I speak of dry plates only, because I have never exposed an emulsion plate wet it is always dry work. The best emulsion is one containing just the merest trace of a free bromide—not with free silver, but with bromide. I have had no difficulty in getting density on very sensitive plates. I can usually guarantee a dozen good negatives from a dozen plates.

Mr. Newton: My experiments led me to adopt a chloride instead of a bromide for removing the free silver from emulsions. I use chloride instead of bromide on account of the retarding influence of bromide in excess. There is no retarding effect in chloride.

The proceedings then terminated.

Photographers' Benevolent Association.

The half-yearly meeting of this Association was held at 160a, Aldersgate Street, on Wednesday evening, July 3rd.

The minutes of previous meeting having been read and confirmed, the half-yearly statement was submitted to the Board by the Secretary, and, compared with corresponding half-year of 1877, it was proved that the Association was making a steady progress.

Miss M. C. Coates and Mr. R. E. Wilkinson were elected as ordinary members of the Association.

Other minor affairs having been dealt with, the meeting adjourned.

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Talk in the Studio.

Photo-block Printing.—There is no branch of photography more interesting and important than its application to the production of printing blocks for working with ordinary type at an ordinary press, and none in which so little has been done in this country. We find in the last issue of our American contemporary, *Anthony's Bulletin*, one of the finest examples we have ever seen, the production of the Photo-Engraving Company, of New York. It is a group of two ladies and a child with a garden-scene background, about half-plate size. It was produced from an enlarged print, the necessary grain and texture being elaborately drawn upon the print with Indian ink, and, when completed, the photograph bleached off the paper, leaving a drawing in mechanical texture. From this the printing-block is produced, and the result here is exceedingly delicate, and very satisfactory. The *Bulletin* says that less than nine years ago Mr. Moss, the principal, commenced the production of these blocks, with his wife for assistant; now the establishment of which he is manager is the largest engraving establishment in the world.

Rapid Portraiture.—The American press teems with praise of Boissonas' rapid process. As we before noticed, some experimentalists are equally loud in their condemnation. *Anthony's Bulletin* lets some curious light upon one of the complainants who had fiercely attached the process in a letter in the *Philadelphia Photographer*. *Anthony's Bulletin* thinks it worth while to examine into the case, and discovers that the bitter complainant had never acquired the process, and had never had either the special materials or instructions!

Hodel.—It is stated that, a week before attempting to take the life of the Emperor of Germany, Hodel had his photograph taken at Berlin. On this occasion he told the photographer that he had better take as many copies as possible. In a week he would be dead; but his name would be known all over the world, and his likeness in request wherever men took an interest in current events. The photograph then taken is in everybody's hands.—*The Stationer*.

Copyright in Photographs.—In the Report of the Copyright Commission we find the Commissioners propose that—"The term of copyright in photographs should be thirty years from the date of publication, except when originally published as part of a book. In the latter case it should be for the term of copyright in the book." With reference to the vexed question as to ownership of copyright, the Commissioners suggest—"That the copyright in a photograph should belong to the proprietor of the negative; but, in the case of photographs taken on commission, we recommend that no copies be sold or exhibited without the sanction of the person who ordered them."—*Publishers' Circular*.

New Electric Light.—A new electric lamp, with incandescence acting in free air, has been described to the French Academy by M. Regnier. A thin rod of carbon, pressed laterally by an electric contact, and forced in the direction of its axis on a fixed contact, is traversed between these two contacts by a pretty powerful current, and becomes incandescent in this part, burning and thinning towards the extremity. As the end gets up, the rod, continually pushed on, slips in the elastic contact, and is thus kept up against the fixed contact. The heat developed by passage of the current in the rod is greatly increased by the combustion of the carbon. An apparatus made on this principle is said to give a clear white light with four Bunsen elements. With a more powerful battery, several lamps on this system may be lit.—*Scientific American*.

Bath Dippers.—I make my bath dippers of three pieces of flat glass—the stem about one inch longer than the bath-holder is deep, two inches wide, with the corners ground off the upper end. The bottom is made of one piece of double thick glass, 1½ inch by about 4, and one piece same length, but ½ inch wider, and thin. These pieces are cemented together so that the double thick or smallest pieces comes between the stem and thinner small piece, which forms a lip, by having all the lower edges even, and the whole then looks from a front view like the letter T with a very long stem. The cement used is two parts rosin and one of beeswax; must be applied hot. The advantages of the dipper are that it will hold the plate better than any other, does not contaminate the bath, is easily cleaned, and cheap.

Showing Negatives.—One of the correspondents, I think in the January number of the *Practical*, advised the toning of negatives with gold as a substitute for the proof nuisance. I move an amendment or substitute, in a weak solution of bichloride of mercury, and, from experience, know it almost abolishes proofs. It can be done in two minutes, is inexpensive, and shows the picture nearly always as good as a tintype. The sitter knows better what it will be, and you know it's O. K.

To Get a Cork out of an Empty Bottle.—I have a piece of heavy wire, fourteen inches long, with a hook on one end for a handle, and the other end bent slightly in many different directions, so that viewed from any side it looks like a waved line. It will fetch out any cork that can be forced through the neck of the bottle at the first trail, by simply upsetting the bottle, running the small end of the wire in, and pulling vigorously when the cork lies besides the rod. This is also handy for washing bottles, by using a rag on the end.—*Correspondent*.

Silver Waste Savings.—The Editor of the *St. Louis Practical Photographer* says:—"In answer to several inquiries about the best method of saving silver, we do not know of any better plan than the one we have been following for some time. We have a couple of large jars, into which we pour the first three or four washings of our prints, and precipitate the chloride of silver by means of muriatic acid. The hypo we pour into a barrel, and throw down the silver by adding, occasionally, some sulphate of potassium." To save the silver generally wasted in developing, we develop over a large deep dish, into which we throw a pinch of salt. The iron will not precipitate all the silver, as we have proven often by throwing some salt or muriatic acid into the dish in which the developer and first washings were saved. The white chloride of silver which was forming would indicate the presence of undecomposed nitrate of silver. There is another advantage developing over a dish holding some salt solution. You can thereby tell whether there is any necessity of adding more silver in developing to bring the negative to the required strength, for as long as any milky precipitate is formed, it shows there is free nitrate of silver on the fill, and no use of adding more. Our paper clippings we burn, taking care not to create too much heat at once, as some of the silver might be carried off by the heat, and be lost. We have tried to refine our silver, but find it more economical to give it to some reliable party who makes a business of it, as the little gain does not make up for the trouble, vexation, and occasional losses by doing it ourselves. Keep the different batches of silver thus saved apart, and thereby avoid trouble and expense to the refiner."

Looking at Nothing.—"Now then, madam, please look steadily at this place on the wall," said a photographer to an old lady, when he had put her in position and the plate in the camera. The old lady looked hard at the spot indicated, then got up and walked across the floor and minutely inspected it, and then, turning to the photographer, gently remarked, "I don't see anything there."—*Family Herald.*

To Correspondents.

Experimentalist.—Full publication of the whole process in such a form as shall render the details intelligible and workable is an absolute condition of patent protection. A specification which withholds some essential part of the method to be patented would render the patent invalid. This has been repeatedly insisted on by the judges in patent cases. Baron Alderson, in one case, said: "It is most important that patentees should be taught that they are bound to set out fully and fairly what their invention is;" and adds "Further, if a patentee is acquainted with any particular mode by which his invention may be most conveniently carried into effect, he ought to state it in his specification." And Chief Justice Abbott has held that "it is the duty of any one to whom a patent is granted to point out in his specification the plainest and most easy way of producing that for which he claims a monopoly, and to make the public acquainted with the mode which he himself adopts." We fear that many of the existing specifications of photographic inventions for which patent protection has been sought fail in this respect.

C. R.—The iodide of silver present in the negative bath has been found to be very objectionable if the bath be used for printing purposes, as it renders the toning process difficult. There are various modes of partially getting rid of the iodide. Adding a few drops of hydrochloric acid, which causes a precipitate of chloride of silver, and takes down with it some of the iodide, is a simple plan. Diluting with twice the bulk of the solution of distilled water throws down the iodide. In both cases the solution should be filtered at once after precipitation, to remove the iodide, which, if left, would be redissolved. Throwing down the whole of the silver as a carbonate, washing the precipitate, and then redissolving with nitric acid, is a good plan. Placing in the solution clean strips of zinc, which will reduce the silver into a metallic form in powder, is a good plan. The silver powder should be washed with dilute sulphuric acid, rinsing well, and then redissolved with nitric acid, and so forming nitrate of silver.

R. L.—Photographic chemicals do not keep well in India. To what extent they can be precured there, we are uncertain. We believe that some are to be obtained in India. We can scarcely advise you as to the amount of materials you should take out, as we have no idea of the amount of photography you intend to undertake. We should think you might take a six months' stock without much risk. A photographic chemist, such as Thomas or Rouch, who is in the habit of preparing outfits of chemicals for India will advise you best.

R. G.—The value of acetate of lead as an aid to the removal of hyposulphite from silver prints has been the subject of much discussion; but, so far as we know, it has never been definitely settled. Many who have tried it extensively speak highly of the results. In our own opinion, careful washing is the best and most trustworthy method.

H. F.—Your request for a good formula for producing enlargements on canvas by artificial light is too indefinite to enable us to assist you, we fear. The best method we know for producing enlargements on canvas consists in producing an enlargement by the carbon process, and transferring to canvas. The next best is producing an enlarged collodion image, and transferring to canvas. You probably wish to render the surface of painters' canvas sensitive, and produce an enlargement thereon by development printing. To do this it is necessary to rub down the surface with alcohol, or with pumice-stone powder and a weak solution of washing soda, until it is no longer greasy in texture, and ceases to repel water. Then treat it like paper, treating it first with a solution of bromide, iodide, and chloride, and then with silver; expose, using magnesium light, and develop with gallic acid. We do not enter into details of formula, because we do not think it possible to get a permanent picture by such a process, as it is impossible to fix and wash properly. If you remember the amount of washing necessary to remove all traces of hypo from a paper print, you will see how impossible it is to treat painters' canvas in a similar manner. We do not think any method of printing a silver print on canvas is likely to issue in permanency. The print, no matter how produced, should be produced first, and fixed and washed, then transferred to canvas afterwards.

Several Correspondents in our next.

METEOROLOGICAL REPORT FOR JUNE.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven, 36 feet above sea-level.

Date.	Barometric Pressure.			Temperature in the Shade.			Remarks.
	Morning	Noon.	Night.	Morning	Noon.	Night.	
1	—	—	29·87	56°	65°	53°	Fair, generally sunny. Distant thunder
2	29·87	29·85	29·82	59	62	55	A little rain morn & evening. Gloomy all day
3	29·80	—	—	60·5	64	55	Fair, but very gloomy
4	29·76	29·70	29·75	56	60	55·5	Rain a.m. and p.m.
5	29·92	29·97	30·00	58	58	63	Fair and sunny
6	—	—	30·03	56	59	57	Fair, generally sunny
7	29·92	—	29·78	58	63	60	Small rain a.m. and p.m.
8	29·58	29·50	29·36	64	64	56	Rain nearly all day
9	29·38	29·34	29·30	60	63·5	56	Rain a.m. and this evening
10	29·38	—	29·54	57·5	—	56	Fair, generally cloudy
11	29·31	29·20	29·13	55	62	56	Rain nearly all day, heavy
12	29·23	29·30	29·[illegible]9	60	57	53	Showers this morning and afternoon
13	29·70	29·79	29·82	57	62	49	Fair, but cloudy
14	29·86	—	29·80	53	—	56	Fair and sunny
15	29·78	29·78	29·72	60	64	56	Fair but dark and cloudy
16	29·70	—	29·70	60	64	56	Rain this evening. Dark thunder clouds
17	29·69	29·72	29·72	63	64	56	Fair, but gloomy
18	29·78	29·82	29·79	63	65	57	Fair and sunny
19	29·84	29·90	29·93	61	64	53·5	Fair and sunny
20	29·95	29·93	29·88	60	66	62	Fair and sunny
21	29·89	30·00	30·03	58	64	54	Rain early this morning
22	30·06	30·06	30·00	56	63	57	Fair and sunny
23	29·98	29·93	29·90	64	68	62	Fair and sunny
24	29·92	29·98	29·99	60	66	62	Fair and sunny
25	30·03	30·05	30·06	58	68	64	Fair and sunny
26	30·05	30·02	30·00	68	78	71	Fair and sunny
27	29·98	29·92	29·90	74	88	77	Fair and sunny
28	29·87	29·88	29·99	77	82·5	64·5	Fair and sunny
29	29·90	29·88	29·80	70	78	66	Fair and sunny
30	29·80	29·81	29·86	69	75	58·5	Fair and sunny

Summary.

	Mornings.	Noons.	Nights
Highest temperature observed	78°	88°	77°
Lowest ditto	53	57	49
Mean ditto	61·1	66·2	58·2
Mean of all observations	61·8		

Number of days on which rain fell	9
Number of fair days	21
Number of fair days bright	16
Number of fair days gloomy	5
Rain	2·25 inches
Evaporation	5·00 ,,
Total rain up to the end of June	12·76 ,,
Ditto, evaporation ditto	17·16 ,,

The weather was excessively hot at the end of the month, as will be seen by the foregoing table, and the change in temperature from the 27th to the 1st of July is somewhat remarkable, the temperature on the 1st of July being, morning, 64; noon, 67; night, 58.

The Photographic News, July 19, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Problem of Photo-type Printing—How to Get Clean Transfers in Photo-Lithographic Work.

The Problem of Photo-type Printing.—The problem of photo-type printing is apparently no nearer solution than it was years ago. What we desire to see is an artist's sketch or design reproduced by means of photography upon a plate such as they employ in the printing press, and this we can do no better than was the case at the time when collotype processes were a novelty. We do not mean to say that no progress has been made of late years in the matter; doubtless many working details have been improved, and there is more simplicity than formerly, but the results are still very imperfect. Take Mr. Blackburn's *Academy Notes* by way of example. Many of the little pictures he gives us are charming, and most of them, we are told, are the work of the artists who have painted the original pictures. They have sent little sketches of their large paintings, and in most cases the sketches have been reproduced by photography. What is the result? In some instances there is nothing but a few blotches and stains of ink to represent the original little design. It is with difficulty only that one can make out what the smudges really are meant for, and if one has not actually seen the original picture, the reproduction could hardly be recognised. We do not find fault with Mr. Blackburn, or his publishers. They have, doubtless, done all in their power to reproduce the artist's sketches successfully, and have refrained from retouching the result, under the impression that the public would desire to have the artist's work as it stands, without any modification. But photography here shows itself quite incapable, under present circumstances, of giving us a passable reproduction in the form of a printing plate. The sketch sent in by the artist was unsuited to the process, and the consequence is the blotchy production which passes for an illustration. That we have the best that can be done is not to the purpose, since the best is very bad indeed. The fault, we repeat, is simply in the process, and it can only be by the artists themselves working so as to humour the process that anything like successful reproductions are obtainable now-a-days. There are some things the process can do, and some things it cannot; and if Mr. Blackburn could only prevail upon his artist friends to do all they can to help him, he would be able to produce a more valuable work still than the present edition of the *Academy Notes.* The so-called Graphic Programme which is to be found in some of our theatres shows how finished photography can do its work if only the work is within its compass. In this case, we believe, the pictures are drawn in the first instance on a very large scale indeed—some two or three feet, in fact—and then reduced by photography to the minute dimensions they appear on the play bill. In this way the most delicate lines are secure, and the pictures have a finish and softness about them not to be obtained by the most skilled graver. Let the strokes be as strong and coarse as you will in the original drawing; it matters little, for they are in some cases reduced to a tenth or twelfth of their diameter. But if we can secure photo-types of this delicate character when our design is in black and white, we fail altogether where the artist has used washes instead of lines. And here, as we have before remarked, is a stumbling-block over which many a photographic experimentalist has stumbled. He takes a line engraving from a book, reproduces it in the camera, and in the end secures the design upon a metal or stone plate, whence copies clean and sharp are printed without difficulty. Having succeeded so far, he imagines he has solved the problem of photo-type. Not at all: he is as far off as ever he was. Because he can reproduce the impression from a finished wood-cut, it by no means follows that he can do the same with the artist's sketch, and thus step in and do the wood engraver's work. If draughtsmen would always work upon a pure white surface, and make lines only with a jet black pencil, the photographer would find little difficulty in securing a metal or other plate for printing from. But the artist does not do this. He makes his drawing sometimes with black lines, it is true, but more often with dark grey ones, and very often employs washes of various shades to indicate to the graver the effect that is desired. A draughtsman works with a sharply pointed pencil, and occasionally drags it broadways across the surface, producing a grey line of some thichness. A photographer would have no alternative but to produce this grey line as well as the thin black ones beside it, and as he would produce them all of the same depth or darkness, the whole aspect of the sketch would be at once altered, since the photo-type would show broad black lines instead of the broad grey ones fomed by the artist. In the case of the wood engraver, he has to use a good deal of judgment in cutting, and when he comes to a broad grey line of this nature, he splits it, leaving a narrow ridge up the centre, which will remain white in the impression. When the sketch is lightly or darkly washed, he does the same, hatching or cross-hatching as the case may be to get the same amount of shading the artist desires to secure. The only photo-mechanical process by means of which we can produce engraved plates from half tints is, as everybody knows, the Woodbury photo-relief method; but in this case, unhappily, we cannot employ printer's ink nor the ordinary printing press, for the striking off is a delicate operation, and transparent ink is a *sine qua non.* Woodbury relief plates with a grain, like those suggested by Mr. Woodbury and produced by M. Rousselon, appear to be the most promising productions in the way of perfect photo-type that have yet been secured; but, for some reason or other, the above gentlemen have not proceeded with the process. This is much to be regretted, for there is apparently little more to be hoped for from the ordinary photo-type process as it is worked at present, and by which only black and white can be reproduced.

How to Get Clean Transfers in Photo-lithographic Work.—A very good suggestion was made a year or two back in one of the Continental journals anent photo-lithography, which has never secured the attention it deserved. It is well known that one of the most difficult operations in the process is the securing of a clean, well-inked transfer. As a rule, a strong, stout paper, of fine texture, such as that known as bank-note post, is taken and treated with a mixture of a bichromated gelatine; upon this bichromated gelatine surface an impression from the negative is taken and this impression is then inked. Either the impression may be put face downwards upon an inked slab, and passed with moderate pressure through a lithographic press, or an inked roller is passed to and fro over the gelatine impression. Some damp the impression before the ink is applied, but in any case the whole sheet is partially or entirely covered with ink. The sheet is then wetted well, and brushed lightly with a sponge, which removes the ink except where the lines are, and these inked lines form the transfer, to be applied to stone or metal as the case may be. The difficulty at this stage is to remove the superfluous ink from the surface of the paper, and this is done much more effectually if, before the sheet is treated with bichromated gelatine, it receives a coating of albumen. The albumen, being very soluble in cold water, comes off very readily as soon as the wet sponge is applied, bringing with it gelatine and ink, and thus a much cleaner job is made than when only gelatine is employed. Photo-lithographers troubled with dirty transfers should make trial of an albumen coating to their paper.

A STATUE FOR NIEPCE.

We print from the *Daily News* the following interesting remarks on the proposal by the people of Chalon-sur-Saône to erect a statue to their townsman, Nicephore

Niepce. There is some confusion as to the relations subsisting between Niepce and Daguerre, upon which we shall have a few words in our next.

"Nicephore Niepce, according to a recent biography, 'never ceased being unknown till the seventh year after the end of his laborious life.' As Niepce's laborious life ended about fifty years ago, it is certainly high time that 'his posthumous notoriousness over-passed the bounds of a straight circle.' This is the opinion of the brave people of Chalon-sur-Saône, whose fellow-townsman Niepce was, and who now assert his merits in a pamphlet written in the English language. We have already quoted two brief passages from the courageous work of the linguists of Chalon-sur-Saône, and they are enough, perhaps, to awaken some interest in the career of an ingenious man, 'whose apotheosis was retarded owing to public error originating from an intrigue.' 'The very rare person hereby alluded to,' as his biographer says, was born at Chalon-sur-Saône, in 1765, and, in the opinion of the people of Chalon, was the father of photography. Up to the present moment no monument has been erected to the honour of Niepce, and the citizens of Chalon think it high time that his statue should decorate the market-place of his natal city. They point out the wonderful character of his invention. 'It was not irrational to prejudge against the future inventor of photography that he had undertaken a run after a chimæra.' This sentence illustrates a very common confusion of thought which may as well be cleared up before we pursue the history of M. Niepce any further. The chimæra was a fabulous animal, partly serpent, partly goat, and partly lion. It was excessively destructive in Lycia and the neighbouring district, and its appearance was dreaded by the surrounding peoples. No one would ever have dreamed of 'undertaking a run after a chimæra,' for the very good reason that the most reckless hunters would have been too much afraid to do so. In spite of these facts, not only English but French people, like the historian of Niepce, constantly talk of 'pleasing chimæras,' of 'pursuing vain chimæras,' and even of taking a run after the creature. To return to the early history of photography. The enemies of an inventor would have said 'Light is aught incoercible; there is no hold on it, and lo! you presume to enslave it?' People actually did speak thus to Niepce, who, in spite of the laughter and suspicion of his fellows, managed, with wretched materials, and 'drugs of questionable genuineness,' to make the sun 'impress a neat and permanent image of the objects disclosed to view by its irradiation.' So at least says the apologist of Niepce, and goes on to tell the old and trite story of inventive genius repressed and robbed by men of the world.

"Niepce, it seems, was not satisfied with this first partial success. No one who remembers the early Daguerreotypes, those hideous representations of the human features which had to be held on one side and squinted at, will wonder that Niepce was not satisfied. Mr. Leech's caricature, representing a happy family group before being 'taken,' and as they later appeared on the plate, was no exaggeration. The poem of 'Hiawatha's Photographing,' by the author of 'Alice in Wonderland,' is another monument of the old and evil days of the process. The bard tells how the baby 'came out' so very badly that

> In comparison the others
> Might be thought to have succeeded,
> To have partially succeeded.

Such partial success was not enough for Niepce, who knew that the public, like the 'fools and bairns' of the Scotch proverb, 'should not be allowed to see half-done work.' In addition to his sensitiveness, Niepce's want of money prevented him from pushing his invention. Niepce had, however, a partner, M. Daguerre, if we rightly interpret the somewhat confused language of his biographer. A 'painter and manager of the diorama,' according to the biographer, got a hint of what Niepce was working at, and 'drew out of his candour the secret of the proceeding. He then entered into formal partnership with the original inventor in December, 1829, and the act of partnership has been published. From this document, we are told, it appears that Niepce 'had already found the fundamental means of rendering permanent the images received in the camera-obscura.' The great difficulty was thus overcome, and there only remained the task of improving the details. The partner 'had lent cunningly to this second-rate task the seemingness of a mysterious indagation, tending to a personal discovery.' Here the biographer has the advantage of his English readers. They cannot easily discover the mystery of this 'mysterious indagation,' and can only suppose that the partner improved the unpublished invention. Niepce died, as unknown as he had lived, and his son, its seems, neither understood nor valued his discovery. The partner stood to Niepce as the inventor of a more or less indifferent modification of the boiler would have stood to the inventor of the steam-engine. In 1827 it is said that Niepce exhibited in England several heliographic drawings of his own, and some even earlier attempts are preserved in the Museum at Chalon-sur-Saône; 'contrarily to which,' says the biographer, 'for the whole lapse of nine years extending from the date of the contract to the divulgation of the proceedings, his partner never did show a single pattern of his own making, nay, to his surest friends.' It is added that in 1839 Mr. Bauer, a member of the Royal Society, declared that the specimens of Niepce, exhibited in 1827, were as perfect as those of Daguerre, 'described in the French papers of 1839.' We do not gather from this statement that Mr. Bauer had seen the examples of M. Daguerre.'

"*Sic vos non vobis* might be the motto and device of inventors. If Niepce did and suffered all that is described, he was only suffering the usual fate of minds in which originality is stronger than self-assertion. Photography has been brought to considerable technical perfection; it is a useful (if not exactly ornamental) craft, and the people of Chalon-sur-Saône think Niepce should have his statue, like another. They ground his claims to this honour on the merits of the process he 'invented'; but perhaps his modesty and perseverance are in themselves things more honourable than his disputed and doubtful success. Certainly the services of photography are many and meritorious, even if we do not actually think it 'a condition of the spiritual life of all nations.' The committee who ask subscriptions for the monument point out that microscopic photography was of great service to Paris during the siege, as messages could be reduced in size, and sent out under the wings of carrier pigeons. Again, 'with the photographer's assistance, the investigations for Verity cease being hard and liable to error; oftentimes he removes the doubts of justice,' though not often, we presume, by the simple process of photographing the eyes of a murdered person, so as to get a portrait of the assassin. 'Physic resorts to him as an infallible demonstrator;' and, in short, photography reproduces with mechanical exactness all objects in nature or art. Deductions have to be made, of course, from the value of the representation, which must always be more or less inadequate, and which has never the spirit, the life, the satisfying human qualities of the work of the artists' hands. It may be true that 'photographic miniatures on enamel, set in rich medallions, are ranked among the accessories of an elegant dress;' but the value of Niepce's invention is rather diminished than increased by the coloured perversions of his process. In bad hands, and when set before dull eyes, photography is actually the rival and foe of art. Its real uses are ancillary and scientific; though, after all, the cheap portraits which photography makes possible are really valuable additions to the sum of human happiness. So hideous and vulgar are some popular photographs of eminent or notorious persons of both sexes, that one is sometimes tempted to wish Niepce, Daguerre, and the others had exercised their inventiveness on some other material. The treasured photographs of the poor, the cheap comfort of the widow, or wife, or mother, atone for the monstrosities of popular photography, for the postures and attitudes of fashionable notorieties, and for the finery and flowers out of which women lift coquettish eyes to every owner of sixpence."

GERMAN CORRESPONDENCE.

BY DR. VOGEL.[*]

Emulsion—Solubility of Nitrate of Silver in Alcohol and Collodion—Picture of the Sun—Blisters in Albumen Paper—Hardened Glass Applied in Photography—Capt. Abney's Researches.

The watchword of photographic success is emulsion, which has reached such perfection that it is not at all surprising to see Mr. Swan, of Newcastle, advertise plates which surpass the sensitiveness of wet plates three times. A striking invention in photography is necessary. Acoustics has recently disputed the standpoint of optics. The telephone carries the word miles off, the phonographer takes it down, and fixes thus an acoustic picture, produced in a mechanical manner, of sound waves, similar to photography, which is based on vibrations of light. Without looking enviously upon acoustics, I yearn for the time in which I can send you my humble correspondence as a phonographic plate; thus you will overcome the reading of my illegible handwriting. Emulsion has lately had more success in Germany, although England is decidedly the Eldorado of the process.

In regard to the practice of the same, Dr. Eder, of Vienna, the excellent photographic chemist, has published the following results about the solubility of nitrate of silver in alcohol.

100 parts of alcohol of 95 per cent. at 66° Fahr. will dissolve 3·8 parts of nitrate of silver; 80 per cent., 10·3 parts; 70 per cent., 22·1 parts; 60 per cent., 30·5 parts; 50 per cent., 35·78 parts; 40 per cent., 56·4 parts; 30 per cent., 73·7 parts; 20 per cent., 107 parts; 10 per cent., 158 parts. In pure ether, and in ether saturated with water, the nitrate of silver is rarely soluble. An addition of alcohol augments greatly its capacity; 100 parts, for instance, of a mixture of alcohol and ether, in a proportion of one to one, will dissolve at 66° Fahr., 1·6 parts of nitrate of silver; mixed in a proportion of two to one, and equal temperature, it will dissolve 2·3 parts. Dr. Eder does not mention the influence of collodion cotton, which is evidently proved by the various experiments with dry plates. A collodion prepared with common cotton for wet plates will easily take one per cent of nitrate; whilst Hopkins's dry-plate cotton always precipitates a part of the silver added in a hot alcoholic solution.

Since it is customary in preparing dry-plate emulsions to boil the alcohol with the silver, it is also interesting to know the solubility of nitrate of silver in hot alcohol. According to Dr. Eder, 100 parts of alcohol of 95 per cent. at 158° Fahr., will take 18·3 parts of nitrate; 80 per cent., 42 parts; 60 per cent., 89 parts. It results that about six parts of hot alcohol are wanted in order to dissolve one part of nitrate of silver.

I received, not long ago, a new picture of the sun, by the astronomer Janssen, of Meudon. It is about twelve inches in diameter, and is distinguished by an immense mass of details. The surface is entirely covered with granulations of different effects, and forms very near that of a circle. It is very likely that contractions have taken place in the photosphere of the sun, which may have been the result of strong atmospherical streaming. The brilliancy of the grains is not constant. The most prominent one is so light that the sun, if it were covered over the whole surface with the same kind, would be from ten to twenty times lighter than it is now. All pictures taken until now in Meudon have shown but very few solar spots. We observe now the minimum of spots. As soon as they commence to appear again, and photography reproduces them with a perfection which Janssen knows how to develop, we may expect some very interesting results.

Photographers in general care but very little about the "blisters" on the surface of the sun, as all their attention is attracted by blisters in albumen paper. Americans suffer more than Europeans. On the occasion of my visit to Philadelphia during the Centennial, I saw that you use a chloride of sodium bath before fixing. This has been frequently tried here, but without success. Alcohol, in which the pictures are dipped before toning, has been recommended as an absolutely reliable remedy; however, the use of alcohol might be expensive. Another remedy has been recommended, a thin fixing bath, one to twenty, or one to thirty; but there exists always a certain distrust of such baths. Herr Warnerke, who has tried to find an explanation of the formation of blisters, attributes it to the imperfect adhesion of the albumen film to the paper,[*] and recommends, therefore, dampening the paper on the back, and letting it dry again. He has tried this simple means with the best of success, inasmuch as there appeared no blisters; but the water on which he let the paper swim attracted such a quantity of silver salts from the paper that it copied but very slowly. Warnerke overcame this difficulty entirely by adding four per cent. of salt to the water. I should say this means is very simple, as there is only one observation to be made, which is, to let the paper swim just so long in this salt solution as will soften the albumen. If the remedy is reliable, it would be advisable for the manufacturers of albumen paper to use it, in order to put, finally, an albumen paper in the market without fault.

Hartglas (hardened glass) has often been tried in photography. It is much more durable than common glass, and consequently less subject to accidents. Its use, however, has always been limited by the fact that it cannot be cut, as in doing so it will always break to pieces. Mr. Simens, of Dresden, overcame this difficulty by manufacturing hartglas to order in any size. I was much astonished when I saw, the other day, that a negative on hartglas, which Simens sent me, could be thrown on the floor without any danger of breaking. At the same time it had a considerable flexibility. I saw, too, that a lead ball, dropped on a hartglas plate from a height of four metres (about thirteen feet), got smashed, without injuring the plate in the least. This experiment proves that hartglas must be quite a convenient article for skylights, which are so often damaged by hail. Simens recently succeeded in grinding this kind of glass for photographic purposes. The most desirable is the hartglas for the Lichtdrucker. The number of plates which he has lost by breaking is very considerable. Roemmler and Jones, of Dresden, successfully tried hartglas, and found that it will bear a pressure under the printing-roller which would break every other plate-glass plate. I suppose also that this kind of glass, on account of its hard surface, is less likely to be injured by chemical reaction than common glass, and that, on this account, it may offer some advantages for the negative process.

The last number of our English correspondence contained an interesting article by my very much-esteemed college fellow, Captain Abney, about spectrum photography. The indefatigable investigator has succeeded in obtaining all details about solar lines in the red and yellow parts of the spectrum, and to amplify greatly our knowledge about this subject. He speaks in his article also of my theory about the effect of colours on bromine plates, and states that only those bromine plates which are supersaturated with nitrate of silver will be influenced by the addition of a dye, and that the same colour is without any effect on plates supersatured with bromide. This observation, which I published two years ago, is quite correct. Abney explains the phenomenon of the effect of dyes in the presence of nitrate of silver as follows:—"The dye forms with the nitrate an organic sensitive salt, which will be reduced by light. This reduced salt acts then as a nucleus for the reduction of the bromide of silver under development." Abney has also shown that a film which never has been exposed to light will show an impression, if over-exposed, to a previously exposed plate. This opinion would be right if the effect of the colours only were noticed in presence of nitrate of silver, but this is not so. A bromide plate supersaturated with bromide, and sensitized with tannin or morphine, will show exactly the same effects; that is to say, the dyes will render the plate more sensitive for those rays which they absorb. Since it is scarcely admissible to suppose that tannin or morphine form a sensitive composition liable to be reduced by the action of light, I regret to say that the explanation of my college fellow will not stand the test. I still study closely this operation by experiments, and very soon will be enabled to communicate to you my new results already obtained.

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[*] *Philadelphia Photographer.*

[*] We pointed out this as the cause many years ago. Blistering occurs most when a thick layer of albumen is present, and is not coagulated by the silver bath throughout its thickness. Longer floating on the silver bath, or subsequent immersion in alcohol, is the best remedy.—Ed. Photo. News.

FREEZING IN HOT WEATHER.

As the artificial production of cold is often a matter of vital importance to successful working in the dark room, we append some extracts from the *Polytechnic Review* which will interest our readers.

"The Hindoos produce ice in very thin sheets by exposing water in shallow earthen pans (resting on straw in trenches) under an unclouded sky. The water radiates heat into space, and as this non-conducting earthenware and straw prevent the supply of this heat from the earth, the result is the chilling of the water and the formation of thin cakes of ice. The Spanish *alcarazas* are porous earthenware jars containing water; and on being hung in a breeze, the rapid evaporation of a portion of the water from the surface of the vessel causes a cooling of the contents. The same effect is in part produced by wrapping a water-pitcher with a wet towel.

"The evaporation of any volatile fluid from the surface of the skin necessitates absorption of heat from the tissues, and causes the sensation of cold. That its evaporation from the surface of a thermometer bulb absorbs heat from the bulb is promptly indicated by the falling of the index column.

"The first of these phenomena is put to practical use in the silver-spray device for producing local anæsthesia. The second is employed in what is known as the wet-bulb thermometer, in which the rate of evaporation of water (as indicated by the amount of lowering of the temperature of the bulb) measures the capacity for moisture (or relative humidity) of the air.

"Fanning, by promoting evaporation from the skin, has a cooling effect upon the system.

"We thus see that all the means of producing artificial cold depend upon the cooling effect attendant upon a decrease of density (increase of volume) of some form of matter—whether we cause evaporation of substances from a normal density, or first compress them, and then allow them to regain a normal density. The first of these modes of procedure is the more simple, but the latter is much the more effective of the two.

"It will readily be seen that on the score of compressibility or volatility alone, there would exist a marked cause for preference of some few among the many gaseous and liquid materials known to us. But another very important element here comes into notice—what is known as *capacity* for heat. If a number of balls of equal weight, of various materials, be plunged into a hot liquid bath, they will receive heat unequally as shown by the quantity of ice which each will melt after a given time of immersion, or the rapidity with which they will penetrate a cake of wax, on which they are simultaneously placed; or if masses of equal weight, of any one material, be heated equally and plunged into equal weights of different liquids, the last will be found to become heated unequally one with another. Hence some materials (possessing a higher specific heat, or capacity for heat) are better adapted than others for the artificial production of cold.

"One more fact must be taken into consideration. While the quantity of heat required to produce a given expansion of any one solid, liquid, vapor, or gas seems to be indicated very clearly by a curve or line of moderate obliquity and regularity, to effect the change from the solid to the liquid, or from the liquid to the gaseous or vaporous condition, requires a marked and abnormal quantity of heat, which is not, after its absorption, manifested in the transmuted substance by any increase of sensible temperature. In other words, to effect an increase in volume requires a certain amount of heat; to effect the change in *condition*—to bridge the chasm between solid and liquid, or liquid and vaporous condition—requires a certain amount more, which is not directly manifested to the senses, but is used in maintaining among the particles the repulsion or tension proper to that condition. Conversely, in causing or permitting an increase of density (decrease in volume), we observe a well-defined relation between the heat evolved and the volume; but at the transition points from gas or vapour to liquid, or from liquid to solid, we note that the abnormal amount of heat which had been latent or hidden away, in maintaining 'tension of condition,' is suddenly evolved—the mass showing a very marked change in condition, without any change in its sensible temperature.

"In increasing the volume and temperature of water beyond the boiling point (a point dependent upon pressure, but which we will assume to be 212° Fahr.), about 967·5° Fahr. are consumed in effecting the change from liquid to vaporous condition; thus we have:—

"Water at 212°+967·5°=steam at 212°. In condensing, the steam gives out thus 967·5 latent degrees; thus:—

"Steam at 212°—967·5°=water at 212°; and hence the reason why steam scalds more severely than hot water.

"Again, water at 32° Fahr., in freezing, gives out 142° Fahr., and becomes ice at 32° Fahr.

"The high specific heat of water moderates very greatly the rapidity of natural transitions from hot to cold, and from cold to hot, owing to the large quantity of heat absorbed in effecting its vaporization, and the large quantity emitted while it undergoes congelation. Insular countries, on this account, seldom suffer great extremes or sudden changes of temperature. The climate is mild. The influence of the Gulf Stream, in moderating the climate of Western Europe, and especially that of the British Islands, is universally recognized.

"At first, snow was used by many nations for cooling purposes, being brought from the distant mountains. Solomon refers to this in Prov. xxv. 13. Nero established storehouses for snow; and even at the present date many Italian cities have no other cooling materials, the first attempt at selling ice in Rome in preference to the dirty snow brought by the peasants, being vigorously opposed as in violation of the rights of those more or less worthy citizens. It was not until 1845 that ice was sold in London, and the custom was largely confined to the better class of green-grocers and butchers. The supply was from ponds and from Norway. Ice was not sold in Boston until 1800; its export to the West Indies commenced in 1805, and has steadily and rapidly increased."

TONING SILVER PRINTS.*

Clean your glass well, procure superior collodion, have a sensitive bath, secure an art poser if you will, a Seavey background, or any other; get an Anderson, American, Optical, or Anthony's box, a Bowdish chair, procure the lightning process, even a wonderful Euryscope, develop your picture, clean, fix, and varnish, go to the trouble and expense of having it artistically retouched, use Gennert's brilliant, Morgan's extra, Clemon's superior, and Willy Wallach's fine, or Copper's cross swords, print deep in the shadows to a slight bronze, wash carefully, and then tone—yes, tone—and what is the result? One-half the pictures that are toned in these United States are not toned, or half-toned, under-toned, over-toned, toned red, black, grey, blue, ashy, and all the middle grades of the above, and the consequence is, that after all the trouble and expense you have been to to reach the toning bath and procure perfect pictures, you find you do not obtain the much wished for effect that you think you ought to, and have at times seen in somebody else's pictures.

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* *St. Louis Practical Photographer.*

In the early days of photography, when pictures were taken on plain paper only, the tones I may say were uniform. There was not produced, nor could be, that variety of tones on plain paper that can be made on albumen paper of the present day. One recommends little of this and little of that; another not so much or a little more. There are no set laws and rules laid down for you to go by; and tone as you may, with all care and watchfulness, you find it almost impossible to produce two batches alike in uniformity or as you would like to produce them.

The New Way in Printing and Toning.

In point of skill and judgment, printing and toning should not be viewed as secondary to any branch of the art, especially should not be considered the least in importance as many would have it. This department is beginning to receive that degree of artistic taste and care that properly belongs to it. Although a good negative is required, as a rule, to produce excellence in results, yet how often do we find a cold, hard print, from a fine, soft negative! And then, again, what a great degree of judgment is necessary to determine just what depth of shade will produce the most natural likeness, and secure the best expression; for every good printer is aware of the fact that the expression is changed with different shades in printing, according as the character lacks in detail by being under-printed, not imparting sufficient delineation, or by being over-printed, and giving the picture a sunk-in appearance.

A few have devoted their time and energies to this long neglected department. Among these men of rare skill and good judgment we mention the name of Mr. H. J. Rodgers, of Hartford, Conn. He believes that in order to secure the finest and most delicate effects possible in printing and toning, and especially if we would render our pictures permanent, we must treat them a good deal after the manner of the French dyeing establishments; that the time is coming when the printer need only to print the exact shade required in the finished picture, and secure that shade, making it fast and indelible.

It has been the custom of many printers to carry the shade so deep and dingy that the print at this stage bore little if any resemblance to the original. Many already deem it advisable to modify this radical or extreme measure, using harsh means on the one hand, and equally harsh manipulation on the other, in order to bring the picture up to the most favourable point of naturalness—that is, provided it had not already been retouched out in the negative. Many objections would be obviated, in some instances, by printing to a certain shade and securing that shade; "bronzing" disappears and dark shadows are greatly modified. Some operators have still the long cherished idea that "a really good negative will print itself;" that "any boy can print." It is the printer who makes the photographs, and while we as proprietors are all dependent upon good work for both artistic and financial prosperity, we should not hazard our future with inexperienced workmen in this important branch of our art. How many negatives are set back upon the shelves after printing without even having had one-tenth of their quality extracted, so to speak, or conveyed to the prints, and, on the other hand, poor, thin, hard negatives have, by careful and delicate treatment, been made to yield fine points. Mr. Rodgers has sent us his favourite formulæ, which we used in making the illustrations for this journal. Those who desire to try it will be favourably impressed with its simplicity and ease of manipulation and certainty of good results. Mr. R. does not print but a slight degree of shade darker than is required for the finished pictures. We will omit the silvering and fuming, as he does not differ in this respect from many other good workmen.

The principal point lies in the acidifying and fixing.

Acidifying Solution.

Juice of	6 lemons
Acetate of soda	½ ounce
Alum	⅛ "
Water	1 quart

Mix and filter.

Take about two ounces of the above stock solution, put it into five or six quarts of water. After having washed the prints some ten minutes, put in the prints one by one, keeping them moving about for five to eight minutes, taking them out as soon as they come to a soft, velvety, rich purple tint. They do not redden as with acetic acid. The prints are converted with a combination of pure citrate and acetate of silver. The alum in this connection sets the shade.

Toning Bath

is a simple warm gold and washing soda bath. Use gold moderately, as it requires less than other processes. The dish of water into which the prints are thrown while toning should have added a few drops of saturated solution of washing soda.

Hypo Bath.

One ounce of hypo to ten ounces water, and to a gallon and a half of hypo bath add about a tablespoonful bicarb. soda. Fix prints forty-five minutes. They will change rapidly at first, but the different degrees of richness and shade they pass through during the forty-five minutes will be very pleasing and satisfactory.

We are indebted to Mr. H. J. Rodgers, of Hartford, Conn., for this great boon to photography. It is given without price for the general benefit, and if a few more of our artists would follow the example of Mr. R., and give something from their knowledge-box, we might be a more happy and contented brotherhood of shadow makers and takers.

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HOT WEATHER CARBON DIFFICULTIES.

Autotype Notes says:—"In photography hot weather difficulties are numerous; in carbon printing they are in legions. Another new one has turned up during the recent burst of hot weather: some of the single transfer pictures in the Autotpye printing department absolutely refused to strip, whilst others in the same tissue could be manipulated in the usual way. This seemed strange, so we tried the following experiment: we took two pictures printed at the same time, and in tissue cut from the same band. They were both mounted on the transfer paper at the same time, the conditions of both being identical: one was placed in warm water to develop in about five minutes after mounting, the other was kept half-an-hour. The first skinned easily enough, and worked up into a good picture; the other could scarcely be skinned at all, and was so insoluble that that the picture could not be developed. It seems as if the moist contact in warm air set up rapid decomposition in the tissue after its insolation. The moral of course is: develop your pictures as soon after mounting as possible."

[This is accordance with Mr. Swan's early experience. In our book on Pigment Printing, nearly a dozen years ago, we pointed out that moisture was a primary cause of spontaneous insolubility, and that heat accompanying the moisture increased the tendency. Keeping the print in a moist state before development is equivalent to slow drying of the tissue.—Ed. Photographic News.]

The Photographic News.

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ARTISTIC TEXTURE IN PHOTOGRAPHS.

We have recently been favoured by Mr. Alfred Harman with a sight of some charming examples of a method of treating enlargements which he has recently patented. At first sight they had the appearance of very highly finished prints, but we were assured that neither prints nor negatives had been worked-up, the retouching on each being confined to the removal of trivial technical effects, all the finished effect being due to photographic operations, and produced by printing. As the method is patented, and it is Mr. Harman's intention to sell instructions and licence to photographers at a moderate charge, we shall not enter into the commercial phase of the question further here than to say that it promises and deserves to be highly successful.

The application of mechanical texture to photographs has often been attempted, chiefly, however, with a view to the production of the photo-engraving plates. It has also been tried for giving a more artistic character to portraits, but not with entire satisfaction. A veil of gauze, a film of gelatine with an aquatint grain printed on it, and similar screens, have been used in printing to secure a general grain. The print has been submitted to pressure in contact with a grained plate, giving it the texture of rough drawing paper. These and other methods have been tried, but have proved defective from the fact that the grain in all cases has been of necessity of uniform size, whilst to meet pictorial necessity, a much finer grain is required for the face and other lights of the portrait than for the dark draperies and background. Mr. Harman's great improvement consists in the fact that he communicates to each part of the picture a suitable grain or texture. The flesh tints and light draperies have a delicate fine grain well suited to the rendering of half tone, whilst the deeper tones and blacks have a bolder grain, which gives transparency, and force, and depth, where these qualities are required.

The great improvement upon other similar methods of treating photographs which was found in Mr. Vander Weyde's system consisted largely in the fact that the texture produced was under the control of the operator, who could modify its character in different parts, and avoid its application altogether where desirable for flesh tints or delicate gradations. The great defect of the various vulgar imitations of that method consisted in the fact that they were, as a rule, applied indiscriminately all over the picture. It is very singular that in using grained screens it did not occur to others to use the ingenious device which, with Mr. Harman, is, we think, quite original, of using grained screens of different texture and quality for different parts o the picture. Mr. Harman uses for the flesh tints, and other delicate portions of the picture, a screen or negative with a delicate stipple or hatching suited to the tender gradations. This delicate texture is, indeed, printed all over the picture, as its presence is not hurtful in other parts of the picture. Then, for the darker portions, such as draperies and backgrounds, grained negatives of bolder texture are used; the flesh tints, and other light parts, being masked to suit each picture, so that they receive no other grain but that from the fine negative. We do not know the precise mode of Mr. Harman's working; but we think it would be often found an advantage to use a negative for graining the background quite distinct in character from that used in the figure, as such a method would materially aid the effect of relief.

It will be readily seen that but comparatively little trouble is involved in this mode of treating a negative. The figure is printed, and the fine grain then printed all over it; then the coarser grained negative, or negatives, which are easily masked, and, by a simple system of registration, printed in their precise places, a very light tint being quite sufficient for producing the effect.

Besides the transparency and vigour secured by the effect of texture, and the sense of finish imparted to the picture, there are other advantages. With the most skilful and careful operating, especially on large plates, it is impossible at times to avoid the presence of spots and small defects, which show painfully in a clean plain background. Such spots seem practically to disappear after a grain has been printed all over the picture, and save a great deal of trouble in otherwise getting rid of them. It will be seen also that the general character of the picture may be considerably modified. If, for instance, the picture, in its original state, be somewhat flat and weak, the shadows or darks of the picture lacking in force and depth, by printing the grained negative for the dark portions somewhat deeply, greater contrast and force are at once communicated to the picture. If, on the other hand, the contrasts are somewhat too strongly marked to secure harmony, then the grain for the darks will be lightly printed, and the finer grain for the lights a little deeper, by which means the intense contrasts will be reduced, and harmony secured. In artistic and judicious hands much artistic quality may thus be secured.

We understand that a supposed novelty has recently been introduced, consisting in producing the portrait upon a specially prepared paper, printed with a fine grain or texture by means of lithography. A carbon print is transferred to this paper, and a good effect secured. We have not seen examples of this method, which, if skilfully managed, will, we doubt not, be effective. But the novelty is another matter. A year or two ago we noticed that paper with a fine mechanical texture, consisting of lines, was announced in the American journals, as offering a great improvement in portraits, and similar things have been attempted in this country. We think more is to be done in this direction than has yet been effected, and Mr. Harman's success may stimulate experimentalists. Let their efforts be, however, in the direction of genuine freshness, not in imitations.

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A REASON FOR NON-SUCCESS WITH CARBON.

In the *Autotype Notes*, issued by the Autotype Company, a very shrewd suggestion as to an important cause of non-success in carbon working is given by Mr. Foxlee. He says the apparent simplicity of the process misleads and disappoints many who undertake to work the process. It *is* simple, and *seems* more so. Hence when the inevitable difficulties come, the worker who had begun with something of the carelessness of confidence is first disappointed, and then disgusted: his *amour propre* is hurt, and he throws the process aside. Mr. Foxlee shall speak for himself. He says:—

"I was asked the other day, Why is it that comparatively so few now worked the carbon process, considering the great number that have purchased licences during the last year or two? I think it may be of some service to consider the matter in the pages of *Autotype Notes*. My answer to the question propounded, that one of the principal reasons was the great simplicity of the process, may sound paradoxical, but is nevertheless perfectly true; for the novice who sees the process worked for the first time is always struck with its extreme simplicity, and thinks there is nothing to learn in it, whereas, if its manipulations were more complicated, he would be differently impressed, and either would not have gone in for a licence at all, or, if he had, would have been prepared to *learn* the process.

"A provincial photographer to whom I demonstrated the process a year or so ago, and who had never seen it worked before, exclaimed, on seeing the result, 'I shall give up silver printing entirely, and shall advertise such in our paper at once.' To my mild suggestion that he should not be too precipitate in the matter, but work the process quietly for a time, as he would probably find that some experience would be required before he could work commercially, he somewhat *curtly* replied that he had been a photographer for sixteen years, and I must have a poor opinion of his abilities if I thought he could not work such a simple process as this, &c.

"This gentleman, after complaining of the quality of one or two lots of tissue supplied to him, has at last given up the process, declaring that it is too uncertain, and cannot be worked. This is only a representative case: scores have made a similar mistake in taking up the process without being prepared to master its details. It is a new process to most, and requires learning. All the experience gained in making negatives and producing prints in silver will help but little in working the carbon process, for it is essentially different both in its principles and manipulations, although really more simple. Given two persons of equal intelligence, and both knowing nothing whatever of photography, I will undertake to teach one carbon printing, and make him capable of copying with its little difficulties, in *less* time than the other can be taught to print in silver, and to meet and overcome its difficulties.

"I well remember in the early days of photography, when the old double toning and fixing bath was in vogue, how many troubles we experienced; then how these were intensified when the alkaline method was introduced, which, by the way, was to have secured absolute permanency. Those who have forgotten these early troubles have only to refer to the journals for 1861—65, and read the correspondence and discussions on the subject; in many cases they will find the same gentlemen were then to the fore as have so recently taken part in the discussions both *pro* and *con* on carbon printing.

"The production of carbon prints with masked and tinted borders is an elaboration that has proved a stumbling block to many, and certainly needs some perseverance and skill to entirely overcome; but this is just as much a refinement in the process as the production of enamelled silver prints, and is no part of carbon printing proper.

"I claim for the carbon process, that it will produce permanent prints equal to the best on albumenized paper with greater ease, comfort, and simplicity than the present method of silver printing, and that it would be quite possible to teach any intelligent person who has had no previous knowledge of photography, and enable him to completely master the process in a shorter space of time than would be required to make a silver printer."

THE FACE IN SHADOW.

BY W. HEIGHWAY.

There is apparent in photographic portraits where the shadow side is treated, a great want of transparency and *colour*—the colour of the blacks. This we have already spoken of as the quality of the shadow.

On the face in shadow we find plenty, and to spare, of shade, but it is too flat and inharmonious, lacking life and vigour, and all that renders a portrait interesting. The monotony of this class of photograph is pitiable.

This want of quality in the tone of the darks extends of necessity to the whites, greatly heightening the harshness of contrast. With the lighted side of the face of blank whiteness, flat as a white-washed wall, the shaded side muddy and dull, the delicate modelling of nature is entirely lost, and we get in its place a hard wedged-shaped thing of wooden aspect.

The beauty of a perfectly shaded picture is due more to the judicious management of the darks, and the harmonious arrangement of the lights, than to the forcible contrasts and any sensational effect. This attainment of eccentric effect appears to be the prevailing idea in the minds of photographers of the intention of shadow pictures, and the result might almost be described as the lightning-and-thunder-cloudoscuro.

The brilliancy of the lights should be due almost solely to the contrast of the darks in opposition certainly not to their own excessive and forced whiteness.

Brilliancy will not come of whiteness and blackness—harshness will, though!

Where prominence is given to the darker side of the face, the interest being centred there, all our attention and skill must be directed to the production of the shadows in all their beauty and perfection. With the two tints commonly attained, one representing the lights and the other the darks, it cannot be supposed that the requirements of Art are satisfied.

I do not talk of "flitting shadows" and "sweet poetic lights" as elements of photographic lighting, but just of means that are well within the reach of any one who, with intelligence and the exercise of a little thought and trouble, will care to avail himself of the powers he possesses.

Beauty depends very greatly on our treatment in pose and arrangement, and more especially in the management of light and shade. Take the most beautiful head, and face it to the light, and photographing the light side the result will be miserably flat and uninteresting, even if we have not succeeded in rendering it positively ugly. Take the flatly shaded side, and the result is worse still. Amiability itself may be made to appear savage by excess of top light; jolly rotundity, worn and haggard by strong side light.

To get fine shadow effects the light must be pure and strong, and admitted through a small opening. The shadows are never too strong where perfect modelling is kept, and the lights will not be harsh, for though you may attain to the extremest contrast, harmony cannot be lost. It is only with weak light that harshness appears, and in the loss of middle tints hard and inharmonious transition from whiteness to blackness is induced.

Whether light or shadow predominate in our picture, it is the middle tones that give roundness.

For instance, let us place a white ball on a table in the position ordinarily occupied by the sitter, and carefully illuminate it. We find on the side nearest the light a perfect gradation of tone to a spot of pure white, and on the shadow side an equally unbroken gradation of shade with a small point of perfect black, both effects realizing the rotundity of the object. If our manipulation of the light does not secure the effect of roundness we know exists, it is clearly at fault. So in the proper degree with our illumination of the human face.

When you have secured perfect rotundity in the lighting of the ball, you have learnt some very useful hints for the illumination of the sitter—but (need it be said?), a face ought not to appear as round as a ball. Do not abuse a power!

The face, properly shaded, should appear to grow out of the background—distinct from it, yet not cut sharply out in the outline. It is not necessarily a fault that in parts of the shadow side outline may appear to be lost in the background.

Above all, it must be understood that in advocating roundness as a quality of good lighting in effects of shadow, that rotundity which is so deceptive as to lead the spectator to the belief that he might take a stroll round the figure cannot be too strongly censured.

Even where the light comes from a point almost directly behind the sitter, the harmony between the tones on the face and that of the background must not be lost. It will be seen that if the background is too light, the outline of the face on the bright side may be entirely lost; this, it were needless to say, is to be avoided.

Take care that the small speck of light in the eyes is in both eyes alike. Sometimes it is found to kill the form of the dark centre of the eye when you may be assured that the lighting is at fault, and change of the sitter's position or of the illumination is necessary.

AMMONIA AND ALCOHOL IN THE BICHROMATE BATH.

Mr. Bolas has an excellent article in *Autotype Notes* on preserving tissue soluble. He says:—

"It is well known that the action of a small quantity of an acid on bichromated gelatine, especially when the gelatine is moist, produces insolubility; and a practical illustration of this is afforded by the fact that tissue which has been exposed to the action of acid or of sulphuretted hydrogen during its drying becomes insoluble. If this action is only partial, the insolubility is confined to the surface, and the developed print is found to be covered with irregular marks, like a dirty scum. This effect of traces of acid in the air of the drying room may generally be obviated by adding half a dram of strong ammonia to each pint of the bichromate bath, this quantity being, in most cases, sufficient to neutralize any undue acidity of the potassium bichromate, and to leave a small excess for the neutralization of acid vapours.

"When circumstances compel us to dry tissue in a very impure atmosphere, a large excess of ammonia may safely be added to the bichromate bath—as much as two drams or more to the pint.

"As the tissue dries, the ammonia evaporates, and when it is quite dry all the protective influence of the ammonia is over. A very small piece of ammonium carbonate, well wrapped up in paper, and placed in the tin or box where the tissue is preserved, will, however, ward off the evil effects of acid fumes, and keep the tissue in good order.

"In many cases the addition of alcohol to the bichromate bath is a great advantage, as its use prevents the gelatine becoming unduly soft in the bichromate bath, and enables us to dry it rapidly, as a comparatively high temperature is required to soften the alcoholic gelatine. Let those who are troubled by the hot season try the following bichromate bath:—

Bichromate potassium	1¼ ounce
Water	30 ounces
Methylated spirit...	4 "
Ammonia	1 dram.

This solution must be kept in the dark, or the bichromate will act on the alcohol, and it must be filtered before use. Those who use it, and who employ a mixture of nine parts of water and one part of methylated spirit for softening the tissue before mounting, need not fear hot weather. Of course the diluted alcohol will be used over and over again, only it must be occasionally passed through a filter kept for the purpose."

FASHION PLATES AND PHOTOGRAPHS.

A Correspondent of the *Queen* has the following suggestion:—

"Certainly it is true that everything can be turned to good account if a little ingenuity and thought are brought to bear on the subject. This is verified by the following instance. No one thinks, perhaps, that fashion plates out of date can be made much use of, much less ornament, but arranged as I will describe they make pretty pictures, with friendly faces. Select suitable figures, cut them out, arrange them singly or in groups, with photographic heads of friends or celebrated people, where the head of the original was, and you have a most amusing page before you. Scenery must be sketched in with colour, shadows added, &c., and the picture is complete. The idea first suggested itself to me by a lady of my acquaintance putting photographic heads of friends on to bodies of her own drawing, some in colours, some in pen and ink. I thought how easy and effective my method was, and I tried it with success. I have now a most amusing album, every page being different, with all sorts of groups, some children, some in extravagant costumes of the present day, and others in fancy dress. I have procured fashion plates from all quarters, and selected the most uncommon. Some of the French ones are very effective. I sometimes fit in friends' faces to a pretty becoming hat or bonnet, and I often colour the face to make the whole complete. I do this quickly by mixing a little liquid gum with the colour, and putting it on delicately, adding additional colour to the cheeks while wet. This is not, of course, so artistic as regular artistic working at a face, but it is very effective all the same. I am having a few of my groups photographed, and the result is admirable. I think this little diversion would be highly appreciated by an invalid or a sick child, and would afford them constant amusement and interest. Let the album have stout leaves, and I would suggest a lock and key to prevent handling. Moonlight scenes, with figures, all painted in Indian ink, with Chinese white, are effective with the photographic heads. The figures in the foreground may be larger than those at the back of the scene, so several sizes of photographs can be made use of. Sometimes a background of gold for the fashion plate groups is an advantage, where the figures are supposed to be sitting in a room or opera box. It throws up the colours, and looks like oiled panelling."

Correspondence.

EMULSION AND DRY PLATES IN INDIA.

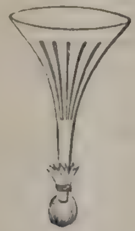
Sir,—Permit me to continue my letter published in the News of the 22nd March. A few errors exist: "pint" should be "part;" "grammes" should be "grains;" and regarding cleaning the glass, "not" should be "rub."

I find that even with equal parts of absolute ether and absolute alcohol lines in the direction of the pour-off occur. The thermometer being 90° and upwards, I recommend a dram of ether being replaced by one of alcohol in the ounce of emulsion, and, if dilution is needed, equal parts of ether and alcohol to be used.

As regards spots, I have found dust, imperfect liquefaction, and imperfect filtration to be the causes. I may be in error, but it appears not improbable that a thin outer coating of the pellicle or powder becomes decomposed and insoluble, and passes through the muslin filter. The pellicle during the hot months becomes very flinty, and should be soaked many hours in the alcohol before adding the ether. I have carefully noted the time, and recommend not less than twenty-four hours' soaking in alcohol, and not less than two days after adding the ether to elapse before perfect solution is effected. Six hours before use the emulsion should receive a good shaking, and then be left to settle, by which means the coarser particles have time to sink. At the time of use I filter off the upper portion only into a collodion pourer, and transfer the filter to a second pourer; the surplus from the plates is poured into the filter, and thus again becomes fit for use. I never return surplus into the pourer from which

I am preparing the plates. The best pourers are Thomas' wide-mouthed stoppered bottles, made for him for the purpose.

The filter is made thus: A small glass funnel, reaching well into the pourer, has four thicknesses of muslin tied at the nose thus:



The great heat at times seems to stop the flow of the emulsion, and in making it flow by tilting the plate it often happens that a quantity overflows; by having the large surface of the funnel to catch the surplus, you can work with greater confidence.

The mode of development I suggested answers well in my hands, and also of others to whom I have communicated it.

It frequently happens, in fixing, that the bromide appears dissolved when it is not. Should a plate in this condition be taken into bright daylight, or allowed to dry before the error is discovered, it is almost impossible to remove the unaltered salt by application of hypo or cyanide. I have given albumen a fair trial, and still give my opinion that it is useless as a substratum. Gelatine answers well, but the emulsion is so powerfully adhesive that nothing is needed but an edging of india-rubber.

The next tried were Russell's bromide of silver bath process, and the same with bromo-iodised collodion; Abney's process; and Kennett's gelatine. It is in apparently trivial matters that I find amateurs fail to succeed. The written instructions are often rigidly adhered to, but still failure is reported. A want of knowledge of chemistry is often the cause, but more frequently want of appreciation of what I may call *chemical cleanliness* is the source of disappointment. In the following description of working I trust you will excuse minute detail, and believe me when I say that in nearly every letter I receive an enquiry asking *the reason why*, I have before me proof of the necessity for exactitude—to leave nothing out in a formula, or take it for granted that the part omitted is known to the merest tyro.

Abney's Process.

A friend tried this excellent process, and although the plates were faultless as regards preparation, he informed me (upon producing some excellent negatives): "To say the process is as rapid as wet plates is all bosh. I have given it a fair trial, and cannot reduce the exposure below seven times that of a wet plate; under the most favourable circumstances forty seconds is the ordinary exposure, while three to five minutes is quite common."

Hearing this, I tried the process, and told my friend I could not imagine how it was that the process was so slow with him, whereas I found it nearly as rapid as wet plates. I asked him for detailed formula. In the two columns I have given the description, not to be followed in future, but to show how easy it is to go wrong.

Formula Used.	Remarks.
Collodion, any good commercial, iodized about a week.	Commercial collodion contains more iodide than bromide. Abney recommends more bromide than iodide; and the porosity of the film is entirely disregarded.
After sensitizing, the plate was washed in a dish of distilled water, then under a tap, and finally flushed with distilled water.	This would constitute *thorough washing*. Abney says *slightly wash the plate*.
The preservative was albumen one ounce, water one ounce, liquor ammonia fortis thirty minims.	The preservative is not Abney's, nor is the way of mixing and applying what he directs. Here want of knowledge of why the large quantity of ammonia is added is apparent, as well as a knowledge of how organic salts of silver are formed and found useful in dry plate photography.
This was mixed with an equal quantity of Bass when I commenced preparing the plates, and filtered most carefully twice through a sponge plug. I reduced the ammonia because it smelt so strong, and I filtered the mixture because it turned milky upon mixing.	Capt. Abney very kindly not only thought for you, but gave you the result of his great experience. You reject his formula, and then say you have tried Abney's process and it is all bosh.
I thought twelve grains pyrogallic to the ounce of water an awful lot, and I found that by using a four-grain solution the development was all right—but I had to give a long exposure.	

I will not go further. Not being able to follow Captain Abney's instructions to the letter, I will merely mention how excellent pictures with an exposure half as long again as a wet plate may be obtained.

Take one ounce of the iodizing solution, and pour it into a perfectly clean bottle. To this ounce add twelve grains bromide of cadmium, shake it up, and, when perfectly melted, filter and re-measure. This filtered solution (filled up to one ounce) is now to be poured into a bottle containing three ounces (by measure) of the mixed collodions; shake up well, and leave to settle for forty-eight hours. The mixture will, at the termination of that time, be perfectly colourless, and will remain so almost till used up. Do not add iodine to make it sherry colour; the collodion being coulourless might be a fault with wet plates, but may be disregarded with dry plates.

The nitrate of silver bath should contain sixty grains nitrate of silver to each ounce of water, and, after it is filtered, half a drop of the strongest nitric acid should be added to every ounce of bath.

The plates should be thoroughly clean, and coated with the collodion without hurry, and, after draining, allowed to set well. Don't be in a hurry to get the plate into the bath, or you will have lines in direction of the dip. The collodion is very porous, and requires time to set.

The plates do not require any substratum, but an edging of india-rubber before development renders them safe.

Allow each plate to remain in the bath ten minutes. I do not mean nine or eleven; ten exactly—that is to say, if you wish for uniformity of sensitiveness.

At the end of the ten minutes remove the plate from the bath, and allow it to drain. Wipe the back, and place face upwards in a dish (about an inch larger all round than the size of the plate) containing distilled water. The quantity of water is governed by the size of the plate. For every five superficial inches of glass, employ one ounce of distilled water in washing. For example, for a plate 8 by 5 it is evident 8 ounces of water are required; a plate 7½ by 5 requires 7½ ounces; a plate 8 by 10 requires 16 ounces, and so on.

The washing is thus conducted. Immediately the plate sinks in the water, rock the dish rapidly while you count thirty by the watch; then leave the plate soaking while you prepare another, and place it, when collodionized, into the silver bath. Now give the dish a second rocking for thirty seconds, and again leave it.

I will presume you have your stock of filtered albumen at hand: also, that in the morning you opened a pint bottle of Bass, and left it standing all day on the table with the cork out. I will also presume you have at hand a glass measure (say a two-ounce measure) and a short glass rod for stirring.

Filter the beer into a clean bottle or measure, and place it alongside of the albumen.

Albumen	... ...	1 fluid ounce
Water ...	... ...	1 ,,
Ammonia	... ...	1 drachm

The ammonia is that sold as "liq. ammonia fortis ·880."

You now remove the plate from the dish (using a silver book), and hold it by one corner in the left hand; now, with the right hand, pour into the two-ounce measure, for an 8 by 5 plate, half an ounce filtered albumen and half an ounce filtered beer; stir round with the glass rod, not like whipping cream, but a regular stir, as if stirring your tea; do it deliberately round and round *three times*; then, as quickly as you can, but without undue hurry or confusion, pour half of the mixture on to the plate in your left hand; commence at the *upper right hand* corner, and make the liquid flow from the upper right hand corner to the lower right hand corner, and thence in a wave towards the upper left hand corner, and down and off at the lower left hand corner. Repeat the operation with the remaining half of the mixed albumen and beer; keep flowing this backwards and forwards, up and down, across from side to side, for one minute by the watch; then pour it off, and wash the plate under a tap, front and back, for one minute; use plenty of water, wash every part of the film, do not allow the water to pour from a height on any one spot, move the plate under the tap, and see that the edges are well washed. After the one minute, swill the plate three times with distilled water, using a couple of ounces each swill, and rocking the plate backwards and forwards each time of application while you count ten (as in quick time); after this, drain and pour over the plate half an ounce of the following:—

Pyrogallic acid	2 grains
Filtered beer	1 ounce

Allow this half-ounce to flow over the plate and off into the sink, and then apply the remaining half ounce. Make this flow backwards and forwards over the plate, and finally flow off into the sink. Drain the plate, wipe the back, and place it on a corner to dry. See that the plates are not touched till quite dry, and that they are not in a draft.

Develop strictly according to Captain Abney's orders. The colour of the negative is non-actinic, and should not be made too intense.

I do not presume to think the above mode of working is equal either in method or result to what Captain Abney teaches. It is offered to my brother amateurs as a safe way of working where Captain Abney's formula for collodion cannot be used from want of materials.

With the same collodion and silver bath a number of plates were prepared with the following modifications:—After removal from the silver bath, each plate was washed in two changes of distilled water (the same proportions for size of plate being used). The plates were rocked about for one minute in each change of water, then removed, and well washed for one minute under a tap; *swilled* with distilled water three times as previously explained, and then had poured over them—

Tannic acid...	15 grains
Distilled water	1 ounce

This preservate, after soaking and being rocked backwards and forwards over the plate for one minute, was washed off in a dish with three applications of two ounces of distilled water; each application being rocked over the plate thirty seconds. The plates were then set to dry as before. *Acid development* was used, and an exposure of six times a wet plate given.

Observe here that in preparation of tannin plates, if a considerable amount of the bath solution is not washed off by distilled water before the plate is washed under a tap, it is not improbable but that stains and pinholes may be complained of. The water I have used (and obliged to use) in stations in Southern India is rich in salts of all kinds, so much so, that in many stations resort has to be made to one particular well for drinking water; for the same reason, the plate is well washed in distilled water before the tannin is applied, otherwise the water will decompose the tannin, and cause rather a perceptible reddish or pinkish tinge on the film when dry, or universal fog upon development. The reason why the tannin is washed off after its application is to remove it, and, with it, its loosening effect upon the film, owing to its acid reaction. At the same time, its removal makes the plate more sensitive.

The development is thus effected. This (and the following) is Major Russell's tannin process:—

P.—Pyrogallic acid	2 drams
Absolute alcohol	1 ounce (fluid)
A.—Citric acid...	60 grains
Acetic acid	30 minims
Distilled water	1 fluid ounce
S.—Nitrate of silver	30 grains
Distilled water	1 fluid ounce

Edge the plate with india-rubber, and place the plate in a dish containing sufficient distilled water to cover it; leave the plate to soak for about three minutes, then pour off the distilled water, and having mixed the following compound, pour it rapidly over the film, and keep rocking it backwards and forwards:—

P.	15 measured minims
A.	10 ,,
Distilled water	1 fluid ounce
S.	5 drops

(N.B.—P. and A. may be measured in the same glass, but S. is best *dropped*); stir with a glass rod, and apply to the film.

The image will commence to appear at once. If more intensity is needed after the above mixture has been allowed to work for a minute, add not more than five drops of S., by dropping them into the glass developing cup, and pouring the pyrogallic mixture on to them; again apply to the film, and, when sufficiently intense, wash and fix—

Hyposulphite of soda	1 ounce
Common water	6 ounces
Or,	
Cyanide of potassium	15 grains
Distilled water	1 ounce

If you apply the pyrogallic P. and acid A. with the water to the film, and omit the silver (S.), a harder negative results, and a longer exposure is needed. The colour of the image at first is a bright clear ruby when looked through. As development progresses, the image changes to a brownish colour; and upon completion of development and after fixing, upon *looking down* upon the plate, the appearance is that of an ordinary wet plate under similar circumstances. With care, correct exposure, and proper development, these plates are very little inferior to wet plates.

The same process, with *bromized collodion* and alkaline development, came next. I have written my method of working from time to time, and despatched it to numerous friends. Any alteration in formula herein discovered may be taken as what I consider a change for the better, and the result of my most recent experience.

F. DAWSON, Colonel.

Secunderabad, 5th June, 1878.

Proceedings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of this Society was held on July 8th, the Right Hon. the Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed, the following were elected members:—W. E. Gibb, Esq.; F. A. Witmore, Esq.; H. S. Simmons, Esq.; E. Dubois, Esq.; and Mrs. Mansel Lewis.

The SECRETARY having laid before the Council the pictures for the current year, Mr. GLAISHER read his report, of which the following is an abstract.

Class 1 contains 73 pictures, contributed as follows:—R. O. Milne, Esq., 19; T. R. Shervington, Esq., 11; W. S. Hobson, Esq., 8; J. H. Leigh, Esq., 6; T. Brownrigg, Esq., 5; F. Beasley, Esq., 3; Sir George Prescott, 3; Major Chadwick, 2;

Major Allen, 2; Mrs. Gulston, 2; W. H. Kirkby, Esq., 2; W. Vanner, Esq., 2; R. Murray, Esq., 2; Rev. W. H. Palmer, 1; J. C. Stenning, Esq., 1; J. E. Thornburn, Esq., 1; Lieut. S. G. Fairtlough, 1; R. Leventhorp, Esq., 1; Rev. W. Hancock, 1.

Class 2 contains 94 pictures, contributed as follows:—The Right Hon. the Earl of Caithness, 3; The Right Hon. the Lord de Ros, 2; R. O. Milne, Esq., 12; Rev. W. Hancock, 8; J. C. Stenning, Esq., 6; J. W. Leigh, Esq., 5; R. Murray, Esq., 5; W. S. Hobson, Esq., 5; F. Beasley, Esq., 4; Rev. H. Palmer, 4; Major Chadwick, 4; Major Allen, 3; P. Gunyon, Esq., 3; W. Vanner, Esq., 3; Mrs. Deeble, 3; R. Leventhorpe, Esq., 3; C. Stephens, Esq., 2; G. W. D. Green, Esq., 2; T. R. Shervington, Esq., 2; Captain Fox, 2; Mrs. Gulston, 2; J. E. Thornburn, Esq., 2; Lieut. S. G. Fairtlough, 2; S. Brownrigg, Esq., 1; E. Milsom, Esq., 1; W. H. Kirkby, Esq., 1; Miss Coxe, 1; Sir G. Prescott, 1; A Watkins, Esq., 1; H. T. Simmonds, Esq., 1.

Class 3 contains 100 pictures, contributed as follows:—The Right Hon. the Lord de Ros, 2; the Rev. W. Hancock, 10; W. Muller, Esq., 8; the Right Hon. the Earl of Caithness, 2; G. W. D. Green, Esq., 6; W. Vanner, Esq., 6; C. Stephens, Esq., 6; E. Milsom, Esq., 5; Rev. H. Palmer, 5; Mrs. Deeble, 4; Mrs. Evans, 4; F. Beasley, Esq., 3; W. S. Hobson, Esq., 3; Major Allen, 3; Capt. Fox, 3; J. C. Stenning, Esq., 3; W. H. Kirkby, Esq., 3; Major Chadwick, 3; G. W. Keeling, Esq., 2; R. O. Milne, Esq., 2; P. Gunyon, Esq., 2; Lieut. S. G. Fairtlough, 2; J. W. Leigh, Esq., 2; R. Murray, Esq., 1; Mrs. Gulston, 5; J. E. Thornburn, Esq., 1; A. Watkin, Esq., 1; H. T. Simmonds, Esq., 1.

The remainder of the pictures are comprised in Classes 4, 5, 6.

Mr. Glaisher, after mentioning the assistance rendered by his colleague, Mr. Sopwith, in the classification of the pictures, remarked, that the large number of fine 12 by 10 pictures sent by Mr. Milne merited the highest commendation, and called special attention to the numerous beautiful Chinese pictures contributed by Mr. Shervington. Mr. Glaisher then referred to some excellent work forwarded by Mr. Hobson and Mr. Brownrigg, and also to two remarkably soft and well chosen views by Sir George Prescott, and a most interesting series of views, recalling Cooke's well known pictures of shipping, by the Rev. W. Hancock.

The following prizes were then awarded:—First Prize to R. O. Milne, Esq., for pictures Nos. 76 and 82, a large silver goblet. Second Prize to T. R. Shervington, Esq., for Nos. 2 and 10, a silver goblet. To R. O. Milne, Esq., for Nos. 70 and 87, an oil painting in gilt frame. To J. W. Leigh, Esq., for Nos. 1 and 4, an oil painting in gilt frame. To W. S. Hobson, Esq., for Nos. 158 and 159, a graphoscope. To Sir George Prescott, for Nos. 1 and 4, a large album elegantly bound in morocco. To Rev. W. Hancock, for No. 13, an oil painting in gilt frame. To F. Beasley, Esq., for Nos. 277 and 279, an oil painting in gilt frame. To T. Brownrigg, Esq., for No. 36, an album elegantly bound in morocco. To Major Allen, for Nos. 102 and 103, an oil painting in gilt frame. To R. Leventhorpe, Esq., for No. 4, an album elegantly bound in morocco.

Certificates of Honorable Mention were awarded to Mrs. Gulston, Major Chadwick, W. Vanner, Esq., Lieut. F. G. Fairthough, W. H. Kirkby, Esq., J. C. Stenning, Esq., R. Murray, Esq., and Rev. H. Palmer.

A vote of thanks to the Chairman was proposed by Mr. Glaisher, and seconded by Mr. Gooch, and carried unanimously, and a vote of thanks was also passed to the Referees for time and attention they had given to the arrangement and classification of the pictures, it having been proposed by Sir Antonio Brady, and seconded by Mr. Howard. A. J. Melhuish, Hon. Sec.

Photographic Society of Berlin.

At the meeting of this Society held on the 16th May, Herr E. Duby in the chair, the principal subject of interest was a lecture, illustrated by experiments, on "Enlargements by means of the Sciopticon," delivered by the Chairman. Two instruments were provided for demonstrating with; the smaller of these, by Messrs. Schmidt and Hansch, could be used only for projections on the sceen, as it was by no means suited for photographic purposes; the larger one by Dr Liesegang, was the one with which the enlargements were actually taken at the meeting with good results, though its arrangement appeared to leave something to be desired. A third instrument, by Herr Karl Gunther, was not exhibited, but a picture of it was projected on the screen, and, as far as an opinion could be formed therefrom, it was judged to be in every way adapted for the purposes for which it is intended, and to be very carefully constructed to meet the requirements of the practical photographer. The lecture itself treated of the different methods of photographic enlargement by means of artificial light, and as its main object was to prove or disprove the value of the sciopticon as a photographic instrument, the practical demonstrations at the meeting were confined to the actual taking of an enlarged negative. As regards both the apparatus and chemicals used, and the operators, this object was effected in what may be called an eminently co-operative manner; probably never was there collected in the same studio such a diversity of workers and materials. The collodion and fixing solution were sent by Herr F. U. Benekendorff; the silver bath by Herr H. Joop; the developer, plates, and dark tent by Herr Carl Suck; while Herr Schnabeli supplied the proof plates, and the apparatus for placing in position the sensitive plate. The manipulation was also accomplished by division of labour: Herr Bock focussed, Herr. Th. Joop coated the plate, Herr Duby exposed, and Herr Suck managed the developing and fixing. For the experiment the enlargment to about two-thirds life size of a transparent positive picture—a bust portrait of cabinet size—lent by Herr Carl Suck was undertaken. An exposure of two and a half minutes was found to be quite sufficient, and all the chemicals worked well. For developing Herr Suck used the following:—

Water	5 kilogr.
Iron sulphate	230 grams
Glacial acetic acid	80 grams
Alcohol	230 ,,

with the addition of a few drops of a solution of sugar. It was, indeed, recommended by one of the members present to replace half of the iron sulphate by copper sulphate, but the change was not found to be advantageous. The actinic quality of the light was increased by a liberal addition of camphor to the petroleum of the sciopticon lamp. For focussing, or rather exposing, Herr Schnabili devised a special apparatus by which the negative plate was placed accurately parallel to the transparent positive plate. At the conclusion of the lecture, which was received with general applause, a wish was expressed by many members present that similar demonstrations should be held more frequently, a request with which Herr Duby promised to comply.

At the meeting of the 6th June, Herr C. Brasch in the chair, a paper was read "On Direct Enlargements from the Negative on Paper by Means of the Drummond Lime-light." This method, though a long time before the public, has not come into general use, partly on account of the expense of the necessary apparatus, partly because few persons are familiar with the preparation of oxygen as required in the process. On the other hand, it possesses the advantage that no retouching of the negative is necessary, but that a positive copy on paper is obtained with a very short exposure. This is of considerable importance, inasmuch as more than one of these enlarged copies is but seldom ordered, and for this one copy we are not compelled, as in other processes, to prepare first a smaller transparent positive, and then an enlarged negative. Moreover, we can by this method obtain pictures of a size larger than any negative that we possess, and without the inconvenience of coating a large plate—always a troublesome operation. The instrument used is manufactured by Dr. Harnecker, of Wriezen on the Oder, and differs from the ordinary enlarging sciopticon only in the construction of the lamp and the omission of the concave mirror. The lamp is made of sheet brass, and contains a reservoir with an upright brass tube; this tube holds the two wicks. It is filled with absolute alcohol, the wicks being drawn out for about half a centimetre. In front of the wick-tube is a second tube, to the upper part of which is fixed in a slanting position a small bore tube terminating in a fine point. Through this fine tube a strong current of oxygen is injected into the alcohol flame, and this produces a very great heat. The hot flame is directed on to a cylinder of lime, and raises it to a white heat, throwing out an intense light. Dr. Harnecker supplies for his lamps specially constructed cylinders of about 4 c. met. in height, and 2½ c. met. in diameter; these have a hole bored through the axis, by which they can be fastened to a pin attached to the lamp. In practice, however, these cylinders appear not to give satisfaction, as they are liable to fall to pieces when touched; they are sent packed in tin boxes containing six, but it is impossible to unpack them without sacrificing one or more before the others can be got out. Much more to be recommended are the so-called English cylinders of Herr R. Talbot, 68, August Strasse, Berlin, N.; they have a much larger diameter, but are less in height, so that the oxy-alcoholic flame plays in the base of the cylinder, whereas in the first mentioned ones it plays on the side. The lime cylinders of Talbot are cased in sheet brass, and if one should split it is kept together by its envelope. For enlargements taken in this way, the negative must be very thin and transparent; the one prepared by Herr Suck for illustrating this paper was developed by a solution diluted with its own weight of water. For this operation a special kind of paper, also prepared by Dr. Harnecker, must be used; the mode of its preparation is as yet a profound secret. A paper manufactured by Dr. Kerrz, of Wernigerode, has been tried by the author of the paper with good effect in sunlight, but without successful results in artificial light. The silver bath must be uncommonly weak, but it must be thoroughly acidulated with glacial acetic acid. A good formula is—

Distilled water	1 kilogr.
Silver nitrate	60 grains
Glacial acetic acid	10 to 15 ,,

A piece of Harnecker's paper is floated on this bath for about ten minutes, then taken out and exposed while still wet, the exposure lasting from one to ten minutes according to the size of the picture and the intensity of the light. For developing is used:—

Water	500 grams
Gallic acid	2·5 ,,

and the exposed picture is left to float on this bath; or it may be laid on a glass plate. The edges are then turned up, and the developing solution flowed over it. Special skill, however, is required to succeed in this last operation. Gilding and fixing are effected as in the albumen process. When the author had finished reading his paper, Herr Suck demonstrated to the meeting the manipulations he had described, and thus made the audience acquainted with the practical details of the process.

A dark tent contrived by Herr Otto Schroder was exhibited to the meeting; it is so arranged as to fold into a small box which is convenient and portable.

Talk in the Studio.

Truth in Photography and in Painting.—One of the Paris Correspondents of the *Daily News*, writing on "Art at the Paris Exhibition," says of one of the five French medallists:—"M. Cabanel is in great demand as a fashionable portrait painter, but whether his efforts in this direction are of the happiest must be determined by the view one takes as to what a portrait should be. A Frenchman having written a guide book to London was told there were numerous inaccuracies in it. "Pooh!" said he, "the style is what you should look to." So M. Cabanel might allege that a faithful likeness is the last thing one should look for in a portrait, it being no business of a painter to emulate photography. His portraits all convey just a faint likeness, much beautified, of the sitter; but are remarkable for some special point on which the artist seems to concentrate all his powers. Different ladies have become renowned for having lovely arms, eyes, hair, or teeth, not because they really possessed these things, but because it suited M. Cabanel to endow them thus richly that the public might stare at a paragon and go away amazed. This is a very pleasant way of practising high art, and much to be commended to a beginner of talent who seeks to become a favourite with the fair sex."

How the Congress was Photographed.—At the close of one of the sittings of the Congress last week Prince Bismarck, mysteriously smiling, requested the plenipotentiaries, all of whom happened to be present, to stay a few moments longer. Of course all expected an important communication. Presently the door opened, and two servants carried into the hall a box covered with black cloth, a young man following. The latter at once addressed the assembly as follows:—"Messieurs, j'ai recu la mission honorable de prendre le portrait d'une séance du Congrès; je vous prierais donc de vous tenir pendant quelques instants dans une position tranquille et aisée." The delegates laughed heartily at this "happy thought," and the world will have a picture representing the Congress in a very happy mood.—*Mayfair*.

Electric Light Photography.—An architectural photograph of a large building has been taken in Dundee by means of the light from a Gramme dynamo-electric machine of a power equal to 800 candles. The view was taken by fifteen minutes' exposure in a crowded thoroughfare, during a drenching rain, and within an hour of midnight. The photograph could not have been taken so well by daylight, for the falling rain would have obscured it.—*Scientific American*.

To Imitate Ground Glass.—Put a piece of putty in muslin, twist the fabric tight, and tie it into the shape of a pad; well clean the glass first, and then apply the putty by dabbing it equally all over the glass. The putty will exude sufficiently through the muslin to render it opaque. Let it dry hard, and then varnish. If a pattern is required. cut it out on paper as a stencil plate, and fix it on the glass before applying the putty, then proceed as above; remove the stencil when finished. If there should be any objection to the existence of the clear spaces, cover with slightly opaque varnish.—*Ibid*.

To Correspondents.

Joseph A. (Penge).—The application of a coat of size to collodion transfers is the best preparation for oil colouring. We have found that a solution of isinglass in gin, or weak alcohol and water, give a good size for the purpose.

Devonian.—You cannot, with propriety, use the term "Autotype" if the pictures are not produced by the Autotype process.

Crapy.—Crapiness in the collodion film is generally the result of the presence of too much water in the collodion; sometimes the result of using a somewhat imperfect sample of pyroxyline; and sometimes from the collodion being too thick and glutinous. We are inclined to think the latter cause is in operation in your case. Possibly, partly from original constitution, your collodion has a tendency to be glutinous, and has grown thick from evaporation of ether during the warm weather. It will grow more limpid as it grows older, and it may, with advantage, be thinned by the addition of a little pure ether. In hot weather, a little care in manipulation is necessary to secure an even film.

A Reader.—We regret that we are without information on the subject.

J. B. P.—The explanation of your difficulty is found, we think, in the last sentence of your postscriptum, where you remark that "the dishes have been used for other purposes, but have been well cleaned," &c. We have never found that dishes used for other purposes, however thoroughly scalded and cleansed, were safe for use with gold toning solutions. We have tried the experiment more than once, and always found that the toning bath became decomposed and the gold reduced, refusing, of course, to tone at the same time, the purple tint arising from reduced gold. Take a new dish, and keep it most religiously for the toning bath, and nothing else.

E. Grant.—The question is a legal one, which we cannot answer. It seems a hard case, certainly; but we are uncertain of the existence of a remedy.

J. Graham.—Take one drachm of nitric acid, five drachms of hydrochloric acid, and six drachms of water; place in this your gold, and apply gentle heat until the gold is dissolved. If after a few hours it is not all dissolved, add more acid in the same proportions. The silver present will go down as a white flocculent precipitate. When dissolved, dilute with as many ounces of distilled water, and add a twenty-grain solution of sulphate of iron. This will throw down the gold, leaving the copper in solution. Wash the black precipitate of gold, and redissolve in nitro-hydrochloric acid as at first. Evaporate to dryness on a water bath. The quantities given will be sufficient for three drachms of metallic gold. Heat may be applied by means of a Bunsen's burner; or you may stand the vessel on the hob near the fire. The operation is best done in the ware prepared for chemical work, but may often be done safely in an ordinary preserve jar. The acids, as you will see, cannot be used again.

R. M.—It is desirable as a rule to tone somewhat deeper than is required in the finished print, as the fixing bath will reduce the depth of toning a little. Prints generally look darker after drying than whilst wet. You will allow for these things when you gain experience.

E. Lancaster.—The process of rolling has an inevitable tendency to stretch any material which will admit of stretching; and it is difficult to entirely avoid it; but following the subjoined hints will aid you. Take care the mounted prints are dry when rolled, as they will stretch most readily when moist. Also take care to use a firm, hard, well-made card. A soft common card will most readily stretch, and, of course, the print must stretch with the card on which it is mounted. If you cannot prevent a little stretching, take care that it shall be in the direction least offensive. For instance, if the portrait be of a very stout person, roll in the direction which will, if anything, make the effect thinner, and *vice versa* of a thin person.

T. Birtles.—In our next.

F. R. Ryles.—In our next.

Several Correspondents in our next.

The Photographic News, July 26, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Photographer's Note-Book—Intensifying with Lead—How a Horse Trots.

A Photographer's Note-Book.—We suppose there are but few photographers who do not carry a note-book. Very early in their career, the value of a small hand or pocket-book, wherein to enter memoranda about formulæ and processes, becomes apparent, and the sooner they begin to keep such a volume the less they repent. The main thing to be attended to is not so much the putting in, as the keeping out, of matter from such a book. We saw the other day a well-thumbed memorandum book of a photographer who had practised the art a score of years, in which not more than thirty or forty small octavo pages were written upon, and yet it contained matter of value which had been collected over a period of many years. All successful photographers do not work in the same manner or with the same tools. In the hands of some, a particular developer is everything that can be desired, while the solution never gives first-rate results when employed by another. And the same may be said of many other formulæ. Look at the preparation of dry plates, for instance. You may know a dozen men who produce vigorous and delicate negatives upon dry films, but the chances are that not two out of three go to work in the same way. Each has his experiences and his wrinkles acquired after long practice, and each follows a pet scheme he has noted. Some photographers, again, are interested in matters which do not concern their brethren. One has noted an intensifier which gives a film as black as your hat, and is as impervious to light as a deposit of soot. He has to do, perchance, with photo-lithography, and to him it is of particular importance to have outlines with dense grounds. Consequently, having found a formula that answers his purposes, he jots it down in his note-book. But in the note-book of his brother, who does nothing but portrait photography from one year's end to the other, the information would be quite *de trop*, and it would be foolish, therefore, to encumber the pages with it. In his case a few rapid developers for winter or summer are probably set down, with a hint or two as to the blistering of albumen paper. For, as we have said, to make a note-book a useful companion, it should not contain too much, and only such matter as is particularly of interest to the owner. It may be said by some: but why have a note-book, and copy formulæ into it which you can always turn up and refer to in the photographic journal or in the Year-Book? It is only the improvident who will talk so. The Year-Book and journals contain the matter, no doubt, but they contain much more, and the time lost in looking for what you want is often considerable. A note-book, in nine cases out of ten, if properly kept up, would supply your want. You may not refer to it very often when you have got it, but the mere fact of writing down a thing is generally sufficient to impress it on your memory. In some cases, of course, one would simply note down where a formula or process is to be found; but where the matter can be condensed, it is always well to put the information directly into your own book. Even when you yourself are cognisant of the method, and it would, so far as you are concerned, be simply a mark of supererogation to note down the composition of a developer or a method successfully employed for recovering silver residues, it is still well to inscribe the chosen method in its most approved form in the event of it being necessary to instruct a third party. Photographers, we know, are chary sometimes of divulging their experiences or "dodges," and therefore prefer in some instances to leave them unwritten; but it is a pity, for all that. A diary, it is said, should be made your confidential friend, and should then be kept as secret as possible. So with the photographer's note-book. Let him lock it up, or, if he thinks it worth while, preserve it in secret; but let him note down anything of value, lest it escape his memory altogether. This we would impress on all young photographers. It is pretty certain they will only write down matters that specially interest them, and hereafter they will find the work has been well worth the trouble. From time to time, as they con the journals, they will perceive a fact specially referring to their class of work, or dealing with a defect or failure with which they themselves are frequently troubled. It may appear to them, at the time, that they will not readily forget the instructions they read, but memory is a treacherous friend to trust to. Much better get out the octavo note-book, and, in a few words, set down the salient points of the matter before them. They will then never be troubled with regrets, and save an hour or two, perhaps, at some subsequent time, in looking for the point which previously struck them. A memorandum book is an indispensable companion to every photographer.

Intensifying with Lead.—As an illustration of the value of a handy note-book, we may mention an intensifying process in our own of which we have several times made copies for friends interested in photo-lithography or zincography. For many years past, the bichloride of mercury intensifying process has been employed by photo-lithographers to secure dense plates, and this, which is usually recommended, certainly yields an opaque film. But the lead method of MM. Eder and Toth, which was published something like two years ago in the *Photographische Correspondenz*, produces a yet more dense film, and has, moreover, the advantage that fine lines are not so readily covered as with mercury. An English translation appeared at the time in these columns, but, as with most things which are new and untried, the formula attracted little attention. We take the opportunity, therefore, of repeating it now, and we can heartily recommend it to those engaged in the preparation of photo-litho. negatives, or in clichès of black and white lines where an exceedingly dense film is desirable. The negative is developed with iron, and after fixing, the film is thoroughly washed, finally, with distilled water, and is laid in a filtered solution of:

Distilled water	100	grammes
Red prussiate of potash ...	6	,,
Nitrate of lead	5	,,

Only distilled water may be used, for if spring water be employed, this brings about a general precipitate all over the negative. The latter is dipped into the lead bath as soon as fixed, but if the film has dried in the meantime, it must be soaked for some hours before being put into the lead solution. When enough intensity has been obtained, the plate is withdrawn from the bath, and treated with sulphide of ammonium, after a rinsing with distilled water. The ammonium is employed in the form of an aqueous solution of twenty per cent. strength. The operator waits until the film has blackened right through, and then washes off the sulphide of ammonium with ordinary water, the result being transparent lines upon a coal black surface.

How a Horse Trots.—We see that an attempt has been made to solve the problem of the position of a horse's feet when he is trotting, by means of photography, taking an instantaneous view of the animal as he passes the camera. It is a pity this plan was not thought of before, when a controversy arose upon this subject out of Miss Thompson's first picture at the Royal Academy. Doughty champions were found to defend the fair artist, and to maintain the painting to be correct; but, for all that, the issue was left in a particularly unsatisfactory condition. It would be well if the camera could be made to give us trustworthy evidence on the subject.

PHOTOGRAPHS OF OFFENDERS.

The chief of the Berlin police has, according to the *Russian World*, presented to the chief of the St. Petersburgh police a richly-bound album, containing photographic portraits of the various criminals who have passed through his hands; and this valuable gift is said to have been accompanied by a request from Herr von Madai that his eminent colleague in the suppression and punishment of crime would forward him a similar collection of Russian offenders. The Berlin police-master has, it further appears, sent copies of his album of suspected and convicted malefactors to all the great capitals of Europe, and to several cities usually deemed of minor importance, but which apparently rank high in the statistics of crime. That the album of Prussian wrongdoers should be sent to such populous centres as London and Paris is intelligible enough; but what have Hamburg and Bremen done, that they should be made the object of such marked compliment, involving, as it does, a similar attention in return? These seaports are probably looked upon as last resting-places for the absconder about to quit Germany for a voyage across the Atlantic, and it has probably not been forgotten that it was from Bremen that a few years ago the explosive apparatus was to have been shipped, which burst prematurely on the Bremen quay. Hamburg, again, besides being an important seaport, is a great commercial city, and wherever business is carried on a certain proportion of business frauds must, of course, be expected.

Frankfort, as the head-quarters of German finance, was not likely to be forgotten, and Frankfort has received its black book, and will, doubtless, in due time, send its own black book in exchange. Where capitalists assemble, thither will those whose aim it is to prey upon capitalists be naturally attracted; and though Frankfort is by no means a large city, its inhabitants need not feel hurt at being classed with the places in whose midst Herr von Madai believes that a large number of criminals habitually lurk. Those who know Baden-Baden in its new aspect, since the abolition of the gaming-tables, the partial suppression of the races, and the desertion of the place by the fashionable world and half-world of Paris, will find it difficult to believe that this most delightful of all inland watering places can be a favourite sojourn for breakers of the criminal law. But heavenly bosoms sometimes harbour rage; a glittering halo may hover round fury; and Baden-Baden, with all its beauty and all its calm, is no better than it should be, and has been esteemed worthy of that somewhat compromising gift, the photographic album edited (strictly for private circulation) by the chief of the Berlin police. . . . . .

Photography has done so much for criminals that it may be doubted whether, on the whole, this, like many other modern inventions, has not benefited them quite as much as it has injured them. In many of the large prisons the inmates are photographed, so that, in case of their returning after their liberation to evil ways, there may be no mistake as to their identity; and in some French prisons the photograph of the criminal is accompanied by a succinct and impartially written memoir, that the police may be able to master at the same time the features of the convict and the leading incidents in his life. This seems hard upon the convict; but how often has he not brought himself beneath the action of the criminal law by a too ingenious use of photography, and especially of photo-lithography, in connection with the production of bank-notes!

It would be interesting to know which first turned photography to effective account—the thief-taker or the thief. Probably the latter, for the police, as soon as they hit upon the notable expedient of photographing criminals, proclaimed the fact to the whole world, that the whole world might admire their cleverness. The criminals did not, of course, do anything of the kind. They behaved with modesty, or, at least, with discretion, executing their photographic reproductions as quietly as possible, and never once boasting of the ingenuity they had shown in turning the new process to a use which had probably not been contemplated by its inventors.

Who, again, is to say whether railways and the electric telegraph have, on the whole, been favourable or unfavourable to the practice of thieving? The thief can be followed quickly enough by train, but by the same means he can get away quickly. In railways, too, he found a new scene of action. How many robberies have been committed at railway stations and in railway carriages, from robbery accompanied by murder to simple card sharping! In England the "road" had already lost its ancient glories when railways were first introduced, but in Spain and Italy, where brigandage still flourished, highway robbery was varied in form so as to suit the new conditions of travelling, and in both these countries banditti learned to stop trains either by placing obstacles on the line and signalling that they had done so, or by the simpler means of letting what they had done produce its natural effect. The electric telegraph, again, though it has helped to facilitate the capture of criminals, has also enabled them, in many cases, to avoid being taken. It has been the means, moreover, of putting money in their pockets. There have been numerous instances of thieves telegraphing in false names for remittances to be forwarded immediately to some foreign hotel, where the supposed sender of the telegram might be, but, as a matter of fact, is not staying. A house of business—a bank, for instance—would pay no attention to such a message, except to request that it might be repeated by letter. But numbers of private persons receiving such a demand, as if from a friend, would do what was desired, and, regarding the case as one of urgency, would reply at once without a thought, and, indeed, without any possibility of making inquiries on the subject.

Among the class of men whose photographs Herr von Madai places in his album are many who are ingenious enough to work telegraphy, photography, and every kind of new invention in various ways, and always to their own immediate advantage. It is right that the tables should sometimes be turned upon them, and the new international exhibition of criminals, which the Prussian police-master is endeavouring to organize, will probably be found a valuable aid to the effective working of the beneficent principle of extradition.

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DIRECT COPYING PROCESSES.

Direct copying processes without the necessary preliminary of taking a negative are frequently desired, especially by architectural draughtsmen. Here are two which have been recently made public on the Continent. The first is that of M. Pellet, of Paris, by whom drawings are made on tracing-cloth or transparent paper, no camera being used.

M. Pellet obtains dark lines on a white ground, and the outline thus obtained may be shaded or coloured by hand afterwards. The process is based on the property possessed by perchloride of iron of being decomposed by light and reduced to a state of protochloride. This last salt is not modified in a solution of prussiate of potash, while the perchloride is immediately coloured blue. The paper on which the copy is to be made is sensitized by immersion in a bath of—

Water	1 ounce
Perchloride of iron	50 grains
Oxalic acid...	25 ,,

The last may be replaced by an equivalent quantity of several other vegetable acids. If the paper is not sufficiently sized, a little dextrine, isinglass, or other similar matter is added. The paper is then dried in the dark, and may be kept indefinitely, always retaining great sensitiveness.

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* *Photographic Times.*

To reproduce the tracing, the latter is placed over a dried sheet of the prepared paper, and a pane of glass over all. In summer about thirty seconds' and in winter from forty to seventy seconds' exposure to the sun is sufficient. In the shade, from four to six minutes; or, if the day be dark and overcast, from fifteen to forty minutes may be required. The electric light acts efficiently, and the exposure varies according to the distance and intensity. The sheet, after exposure, is immersed in a bath of prussiate of potash (fifteen to eighteen per cent. in water), which immediately colours blue all the parts in which the perchloride remains unaltered. The sheet is then washed in plenty of water, and dipped in a bath containing an eight to ten per cent. solution of hydrochloric acid in water, which removes the protoxide. Washing and drying finish the operation.

An Aniline Process.

The second process, like that of Mr. Willis, depends on the use of aniline, and is due to Mr. Schroeder, of Kiel, engineer in the German navy. The bath in which the paper is sensitized is composed of—

Water	2 ounces
Bichromate of potash	7 grains
Phosphoric acid	70 „

The exposure takes place in the printing frame as usual. Experience and an actinometer must guide as to time, as no visible image is formed.

The print is taken out in a dark-room and developed and fixed at the same time in a wooden box by means of aniline vapours. A few drops of what our contemporary *Correspondenz* calls "analin oil" is dropped on the bottom of the box, or on a piece of blotting-paper, for developing and fixing of the drawing in the course of half-an-hour.

MAXIMS FOR LUNATIC PHOTOGRAPHERS.

BY A. SOFTHEAD (HANWELL).[*]

1. Always polish your lenses with Day and Martin's blacking; it will prevent any stray light affecting the sensitive plate.

2. Never neglect to take the stopper out of your collodion bottle overnight; you will always then be able to secure a collodion of good body in the morning.

3. Remember to dip your dark slides in a pail of dirty water before commencing work for the day; it will make a marked difference in your results.

4. Never (if you should be in business) develop more than one plate per hour yourself—always let your assistant do the rest. You pay him so much per week, and if his health suffers, that is his business. He should belong to the Photographers' Benevolent Society.

5. Never sensitize more than a dozen plates in the same bath; then throw it down the sink. Send an advice-note to the Commissioners of Sewers, and at the end of the year wait upon them for the money.

6. Never try a new formula if offered you gratis. The old ones will answer every purpose; and people have no business to annoy you by proposing new ones in a disinterested manner. But—

7. Whenever a secret or patented process is offered you at a high figure, purchase it without hesitation. *You* may not have the patience to search out old ideas, or the impudence to call them your own; but you should always make a point of encouraging these talents in others.

Finally. Don't tell everybody you are a fool: let them find it out for themselves. Or else, write an article for the journals on a subject you don't understand; the result will equal your most sanguine expectations.

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[*] If our readers will carefully reverse the advice of our lunatic contributor, they will ascertain that there is "method in his madness."—Ed.

AUTOMATIC ELECTRO-PHOTOGRAPHY.

In our issue of the 26th October, 1877, we quoted, from the San Francisco *Alta*, a notice of photographs of a trotting horse, taken by Mr. Muybridge. The paragraph stated it to be the intention of Mr. Stanford to have a series of views taken to show the horse's step at all its stages, so as to settle the controversy among horsemen as to whether a fast trotter ever has all his feet in the air at once. As a contributor, on another page, reminds us, in a discussion arising on this subject out of Miss Thompson's first picture at the Royal Academy, the issue was far from satisfactory. The following account, therefore, taken from *The Resources of California*, will no doubt interest our readers :—

> In our October number of 1877 we published an engraving of the celebrated trotting horse Occident, copied from a photograph by Muybridge, made while the horse was being driven at a 2:40 gait on the race track at Sacramento. The position of the horse during the portion of the stride represented in the photograph, being so entirely at variance with the ideas at that time held, both by artists and nearly all the most experienced turfmen, excited, probably, more adverse comment, and we may add ridicule, than ever was devoted to any picture professing to be the faithful portrayal of a horse in motion.
>
> We had, ourselves, seen the original negative from which the photograph had been printed, but, at the request of the artist, abstained from justifying either ourselves or him by any reiteration of its authenticity, conscious its perfect truthfulness would be made apparent in good time.
>
> This artist, who seems to be constantly exploring new fields for the exercise of his profession, and as constantly achieving success in fields which no other photographer has the boldness to enter, has, for many months past, devoted himself patiently and indefatigably to a scheme which is destined to work an entire revolution, not only in all future illustration of the action of the horse in fast motion, but also in the management of horses on the turf, by the light thrown upon movements hitherto unknown, and in many respects even unsuspected.
>
> The culmination of his experiments took place on the Palo Alto race track in presence of the owner, Leland Stanford, and a large number of invited guests, assembled to witness the accomplishment of a task which throws all other achievements of the photographic camera entirely into the shade. Under a shed, on the south side of the track, were arranged, upon a platform, twelve cameras, in spaces of twenty-one inches each, with lenses manufactured expressly for this purpose by Dallmeyer, of London. In front of these cameras were placed the shutters, to each of which was attached a magnet, and armature, communicating with an electric battery, and so arranged that on the completion of the electric circuit at the proper instant of time, the shutters would expose the sensitive plate to the action of the light and immediately close again. Upon the opposite side of the track was placed a screen about fifty feet long, and fifteen feet high, at a suitable angle, to secure the greatest amount of reflected light, covered with white linen cloth, and divided by vertical strips into spaces of twenty-one inches, each with a consecutive number. Eighteen inches in front of this background was placed a foot-board twelve inches high, with longitudinal lines four inches apart. In front of this foot-board a strip of wood was fastened to the ground, upon the top of which wires were properly secured at an elevation of about an inch above the ground; each wire was held in proper tension by a spring on the back of the foot-board, so arranged that the depression of a wire drew the spring and completed the electric circuit. These wires were placed at distances corresponding with the cameras on the opposite side, and with the spaces on the background. From this it will be readily seen the depression of the first wire would cause the exposure in the first camera; of the second wire, the second camera, and so on; and if everything was properly arranged, the driver would simply have to keep the wheel of his sulky in the track provided for it, and as it successively depressed the wires, and established the electric circuit, a series of photographs would be made by the mechanical action of the wheel itself. Everything being properly adjusted, and the track whitened, Abe Edgington, a well-known trotter belonging to Mr. Stanford, was brought out for the trial, the driver (Marvin) started round the track, and came dashing by in front of the background at a 2:24 gait; the wheel passing over the wires completed each circuit in succession, and during the half-second or less occupied in passing the cameras, twelve successive exposures were made in the cameras. In a few minutes'

time the negatives were developed, and submitted to our inspection. Each one was perfectly sharp, showing in each of them every foot of the horse perfect in its outline, and the body, harness, &c., full of detail—even the slender whip was as well defined as if it had been motionless in the head-vise of a gallery.

The following admirable analysis of a series of these pictures has been furnished us by Gov. Stanford:

"In figure one the horse is shown with his nose in the space nine and his left hind foot in space three, in the act of leaving the ground, the right fore foot, which moves in unison with it, having already been raised nearly twelve inches from the ground as is shown by the third horizontal line, which is twelve inches above the track. These two feet, the left hind foot and the right fore foot, do not again touch the ground until in figure eight, and then remain on the ground until eleven, where the stride is completed, and they are in the same position as in figure one. Figure one admirably shows the fact that the fore leg is raised first, as would seem necessary from the fact of its being the shorter.

"In figure two, taken at a point twenty-one inches further on, the left hind foot is clear of the ground, as it evidently has been a part of the time between figures one and two, and the horse is literally flying in mid air. The right hind foot and the left fore foot have been stretched forward as far as possible, and are just about to strike the ground.

"In figure three the left fore foot and right hind foot have struck the ground, where they remain as long as the horse can swing himself forward on their leverage, as shown in figures three, four, and five. The left hind foot and right fore foot are being drawn up before being carried forward—note how close the fore foot is doubled under the breast.

"In figure four the horse has gone forward another space, bringing himself directly over the left fore leg, which is nearly vertical. The pastern of this leg and also of the right hind leg is much bent, being almost parallel with the ground. This position of the pastern is noteworthy, as it allows the horse—although the fore leg is vertical—to maintain an uniform height from the ground, and to derive considerable propulsive force from the straightening of the pastern of the fore leg just before it leaves the ground as shown in figure five.

"In figure five, which nearly completes a half stride—compare with figure one—the horse is exerting his greatest propulsive force by the muscles of the right hind leg and the straightening of the pastern of the left fore leg—note also that the last impulse given to the horse before leaving the ground comes from the straightening of the pastern of the hind leg.

"In figure six the right hind foot and left fore foot have left the ground, and the horse is again in mid air and remains so during the time represented by figures six and seven, and apparently during a part of the time intervening between figures seven and eight. This is shown by noting the space in fourteen, in which the right fore foot about to strike in figure seven appears, and comparing with the space fifteen in which it actually strikes in figure eight.

"In figure eight the left hind foot and right fore foot, which left the ground in figure one, again strike; the right fore foot, which last rested on the ground in space five, now strikes in space fifteen, and the left hind foot, which last rested in space three, now strikes in space thirteen. The horse's head, which in figure one is entering space nine, is now entering space sixteen. These two feet remain on the ground while the horse, by their leverage, passes through spaces sixteen, seventeen, and eighteen, as shown in figures eight, nine, and ten, until in figure eleven he is again about to leave the ground in the identical position shown in figure one, thus completing one full stride. The left hind foot, which is just leaving the ground in space three, figure one, is again just leaving the ground in space thirteen, figure eleven. This would make the stride about ten spaces of twenty-one inches each, or seventeen and a-half feet, but by measurement of the foot prints on the track the stride was actually eighteen feet. By an analysis of this stride, it will be seen that the left hind foot and right fore foot, which left the ground in figure one, do not strike until, in figure eight, the horse has moved about twelve feet, and they then remain on the ground until he has completed the stride, or while he passes over about six feet more. This is shown by the position of the horse's nose in figures one, eight, and eleven. In other words, any two feet of a horse, with this stride and speed, will rest on the ground about one-third of the time, and will be off the ground about two-thirds of the time and distance. During the stride, the opposite hind and fore feet were also on the ground while the horse was moving about six feet—see figures three, four, and five—or about one-third of the whole time. This would leave a distance of about six feet, or one-third the time, in which no foot touched the ground—see figures two, six, and seven. The relative time that a horse is off and on the ground depends, of course, upon the length of stride and speed."

One would have supposed the exhibition we have attempted to describe would have been amply sufficient for one day's enjoyment, but a still more surprising performance awaited us, being nothing less than a series of similar pictures illustrating the action of a thoroughbred running horse at its highest speed.

For this purpose a number of almost invisible threads were stretched right across the track at the height of about three feet, and the celebrated flyer "Sally Gardner" was ridden by the jockey Domm, at a 1:40 gait in front of the apparatus. The resulting series of pictures were probably the most curious and original illustration of horse locomotion ever before seen. The motion of the long, uniform, graceful stride in which, hitherto, the running horse has always been depicted, was most cruelly and abruptly dispelled. In not a single picture of the twelve negatives, illustrating the complete stride of one of the most gracefully built and superbly stepping thoroughbred mares in the country, did her legs or body offer the slightest resemblance to any picture of a running horse we ever recollect seeing. As no photographs from this series of remarkable negatives have yet been issued, we must reserve any description of them for a future number of our paper.

It is difficult to say to whom we should award the greatest praise: to Governor Stanford, for the inception of an idea so original, and for the liberality with which he has supplied the funds for such a costly experiment, or to Muybridge for the energy, genius, and devotion with which he has pursued his experiments, and so successfully overcome all the scientific, chemical, and mechanical difficulties encountered in labours which had no precedent, and which have so happily culminated in such a wonderful result. We hope he will reap the benefits to which his genius and success clearly entitle him.

APPLICATION OF PHOTOGRAPHY TO PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

BY THOMAS BOLAS, F.C.S.[*]

Lecture 1.

Photo-lithography and Photo-zincography.

When a photographer wishes to take a picture, he, as a rule, begins by making what is technically known as a negative; this being a transparent picture having the lights and shades reversed. Now, here is a negative; as I hold it before the lime-light you see that the parts corresponding to the dark portions of the original are transparent, and those parts which correspond to the lights of the original are opaque. Here, on the other hand, is a positive, or transparency, of the same subject as the negative which you have just seen; the lights and shades of this being as those of the object represented. A negative taken from nature should show the reverse of all those gradations of light and shade which characterise natural objects, while a negative taken from a line engraving or a page of letter-press should show only two gradations, complete opacity and clear transparentness. Here is such a negative; and notwithstanding the fact that the opaque parts are not quite opaque to the sight, they are chemically opaque—that is to say, they will not allow the photographic rays to pass through. I have nothing to say to you regarding the making of negatives, as this matter belongs to photography proper, and not to our present subject.

Here is a sheet of paper which has been so prepared as to become darkened on exposure to light: let us place this behind our negative, and allow the light of burning magnesium to shine on the face of the negative. You see the result. Those parts of the paper which were covered by the transparent parts of the negative have become dark, while those parts which were protected from the light by the opaque parts of the negative retain their original white colour. Thus a positive print is obtained on paper; but if the paper print be now exposed to daylight the whole will become dark, the picture, consequently, disappearing.

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[*] A series of Cantor Lectures delivered before the Society of Arts in Spring.

This operation illustrates the first phase in the process of photographic printing as usually practised, the next step being that of unsensitising the paper, so as to prevent the complete darkening which would otherwise ensue on the further exposure of the print to light. Our object now is to study the means of producing printing surfaces (plates or blocks) from which copies can be printed without the direct action of light being concerned in the production of each print.

The piece of peper which I now hold in my hand is sensitive to light, and I will place it under this negative of a line drawing, and expose to the action of an intense light. You observe that a very faint brown image is now produced on the sensitive paper by the action of the light shining through the transparent parts of the negative; and I now hide this from your view by covering the face of the paper with a thin and uniform layer of printer's ink. For this purpose the ink is diluted with a little oil of turpentine, and applied by means of a dabber made of the glue and treacle composition which typographic printers use for making ink-rollers. The oil of turpentine soon evaporates, and leaves a compact and thin film of printer's ink on the paper. I next put the inked print into water, and leave it there while I tell you how the sensitive paper was prepared. A sheet of plain paper is first floated on this warm solution of gelatine (containing six per cent. of gelatine), and it is then hung up to dry (as I do now). When dry it is insensitive to light, and it may be kept any length of time without injury. To make it sensitive to light it is soaked for a few minutes in this solution of potassium bichromate, which contains about three and a half per cent. of the salt, and it is once more hung up to dry, but this time in a dark room, or in a room illuminated by yellow light. When dry, it is ready for exposure under the negative.

Let us now return to the inked print which we left soaking in water, and try the effect of gently brushing the inked surface with a wet camel's-hair brush. You see that the ink is gradually coming off, but in order to save time let us employ a little warm water, and, at the same time, continue to use the brush. Now the end of the matter is, that the printer's ink becomes removed from all those parts of the paper which were not exposed to the action of light, and an image in fatty ink is thus obtained on the gelatinised paper. From this I now remove the excess of water by means of blotting-paper, and lay the print, inked face downwards, on a clean and slightly warm lithographic stone. The stone and paper being now passed through the press, you see that the paper adheres firmly to it, but on moistening the paper with a sponge it becomes easily removable. Now I strip it off, and you see that the fatty ink is fixed on the surface of the stone, leaving a perfect but reversed image thereon. Remember that this image consists of fatty printer's ink, and that it penetrates a short distance into the porous stone. Next, I put some thick gum-water on the stone, and this also penetrates a short distance into those parts of the stone not already covered with printers' ink. I now rinse off the excess of gum and apply the inking roller; you see that the ink only adheres to those parts already inked—the gummed parts resist the ink, and consequently remain white. A sheet of paper being now laid on the stone, I now pass the stone and paper through the press, and you see that I get an exact counterpart of the original fatty image (technically called a transfer) which was put down on the stone. Numerous copies may be printed from the stone by repeating the damping and inking.

You will recollect that when the light brown image was inked with printers' ink, the ink covered the whole face of the paper; but when this inked image was put into water, the ink became easily removable from the unexposed parts. Now gelatine, which contains potassium bichromate, undergoes a remarkable change when exposed to the action of light. It not only becomes brown in colour, but it loses its property of swelling in water, and, at the same time, it refuses to be moistened; in fact, water rolls off it just as from a duck's back. Now, when the inked print (transfer) is put into water, the unexposed parts of the bichromated gelatine swell, and loosen their hold on the fatty ink, while the exposed parts neither swell nor absorb water, but hold the ink firmly. In this dish are some uninked transfers, which have been soaked in water, and if you examine them closely, you will be able to trace those parts of the gelatine which have swelled, leaving in each case a delicate *intaglio* image, or representation, of the negative employed.

Instead of putting the photo-lithographic transfer down on a lithographic stone, it may be put down on a zinc plate, and the plate can be printed from, if treated exactly as the stone was treated. There are on the table some zinc plates and stones, with images transferred thereon, together with proofs from them; and there are also specimens illustrating the various phases of photo-lithography and zincography. Messrs. Whiteman and Bass, who have been most successful in the commercial practice of photo-lithography, have kindly lent me some very fine specimens of the work, which I am sure you will examine with much interest. There are also on the table some admirable specimens of work by Mr. Maurice Adams.

You understand that, in its usual form photo-lithography is only adapted for the reproduction of line subjects, or subjects in extreme black and white, and various attempts have been made to render it available for the reproduction of the gradations of a negative taken from nature. By a modification of Asser's starch process I have been enabled to get results which are at least encouraging. Here is a sheet of blotting paper which I now cover with ordinary flour paste containing 8 per cent. of flour. The paper having been coated, it is next smoothed with a soft badger brush, just as I am doing now, and when dry the paper is soaked in a 3½ per cent. solution of potassium bichromate, in order to make it sensitive to light. This piece of the sensitive paper being placed under a negative, and exposed to the light of burning magnesium for a few minutes, soon becomes tinted with a brown colour where acted on by light as you see. The light brown print is next soaked in cold water, in order to remove the unaltered portion of the potassium bichromate, after which it is dried and ironed with a warm flat-iron, just as I am ironing this one. This last operation is to harden the coating. I now put the ironed print into water, take it out, lay it on blotting-paper and dab on printers' ink with a stiff brush. You see that the ink adheres to those parts where the bichromated paste has been made insoluble by the action of light, and it refuses to adhere to those parts where the paste remained unaltered. In this way a fatty transfer is obtained which, as you see by these examples, shows all gradations of a negative taken from nature, not, however, as a true half-tone, but as a grain or stipple well adapted for transferring to stone or zinc. As a fine image of this kind is liable to get clogged up when printed from stone, it is better to transfer it to a plate of zinc, and to make a typographic block from this by the method which I shall describe in a subsequent lecture. In the interval I will convert this zinc plate into a typographic block, and you will be able to compare these proofs, printed by the lithographic method, with others which I will take from the typographic block.

I hope some of you will experiment on Asser's process, with the view of improving it, as this method affords a promising field for work, it being specially adapted for large pictures.

The Photographic News.

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NICEPHORE NIEPCE AND THE ORIGIN OF PHOTOGRAPHY.

We reprinted in our last an interesting article which appeared in a daily contemporary, on the proposed erection of a statue to Nicephore Niepce, the first producer of a permanent sun-picture. The writer of the article displays a laudable desire to correct "confusion of thought," and digresses from his subject to correct a common error or misapprehension in speaking of a "chimæra" as something intangible and rather attractive, instead of a fabled repulsive compound of goat, lion, and serpent. It may be well for us to point out an equally mischievous confusion of thought or misapprehension in regard to M. Niepce and his relation with the origin of photography, and to M. Daguerre. It is a common error to regard M. Niepce as the originator of photography. Without in any degree depreciating the claims of M. Niepce, we may remark that his discovery, which was most meritorious and interesting, had scarcely any relation whatever to photography as practised in the present day. It is also believed by many, and is, it appears, asserted in the pamphlet from which our contemporary quotes, that Niepce was the actual discoverer of the process by which Daguerre obtained honour and pension, having drawn the secret out of the candour of Niepce; and the specimens Niepce produced in 1827 are alleged to have been as perfect as those of Daguerre, described in the French papers of 1839. This may be so; but in truth they were not really, in any way, fairly comparable, being produced by very different processes.

"No one," our daily contemporary remarks, "who remembers the early Daguerreotypes, those hideous representations of the human features which had to be held on one side and squinted at, will wonder that Niepce was not satisfied with his first productions." The confusion of thought of which we complain is distressingly manifest here. Why Niepce should be dissatisfied with his early productions because of alleged defects in those of Daguerre, which they did not resemble, it is not easy to say. Before explaining the difference between the two results, and the processes whereby they were produced, we must be permitted to offer our humble protest against the description of the early Daguerreotypes in which our contemporary indulges. The shimmer of the reflecting surface was, it is true, troublesome to uneducated eyes, but the exquisite delicacy and gradation of the image has never been surpassed in any production of the graphic arts. The "squint," to which the writer refers as necessary, could only have reference to those afflicted with strabismus, and may have been accompanied by the moral obliquity which has induced such an unfair description of a beautiful process.

Whatever the defects or beauties, however, of Daguerre's process, neither of them had much in common with the results of the process of Niepce; nor could one have derived much aid from the other in perfecting his results. Unfortunately, we have little information as to the steps which led either of them to his final results. The process of Niepce bears no relation, so far as we know, to that of any previous experimentalist. The essays of Wedgwood and Davy, even if they were known to the enthusiastic recluse philosopher of Chalons-sur-Saone, were made with salts of silver, and could not afford any suggestion as to the sensitiveness of resinous substances. Niepce depended for his results upon the susceptibility to the action of light of asphaltum or bitumen of Judæa. A film of this substance was spread upon a plate of white metal—silver or pewter, for example—and submitted to the action of light, by which it was rendered insoluble in its ordinary solvents, the essential oils. Thus, when submitted to an image formed by light, all the portions receiving the light became insoluble, whilst those not illuminated retained their solubility. When the proper solvent was applied, the unlighted portions were dissolved and washed away, whilst those upon which light had acted, remaining insoluble, gave the black parts of the picture. The lights of the picture were formed by the white surface of the plate of pewter, and the shadows of bitumen. We have seen some of the few examples left by Niepce, and can bear witness that they have no resemblance to Daguerreotype.

The Daguerreotype image, when finished, consisted of lights formed of white amalgam of mercury and silver, and the shadows of the black polished silver plate. The black polished plate presented a reflecting surface which rendered the examination of the image on its surface somewhat inconvenient. Daguerre, no matter where he obtained his first information, did not work on the same lines as Niepce, but upon those laid down by his English predecessors, Wedgwood and Davy, salts of silver forming the sensitive agent. The grand stroke upon which success depended, the development of an invisible image, was due, we are told, to happy accident. Plate after plate coated with iodide of silver had been exposed and put away in a cupboard in despair, with no indication whatever that light had produced any action whatever. The day came when the cupboard must be cleared out of the accumulated failures, when, to the unspeakable delight of the experimentalist, he found that one of them contained an image. Those who have toiled for years in almost hopeless pursuit of an idea, alone can conceive the glad "Eureka!" that burst from his lips as he proceeded to search further for the cause of his success. This he found in a vessel of mercury which stood just below the place where the plate had rested. The exposed plate had accidentally been submitted to the fumes of mercury volatilized at the ordinary temperature of the room. The result obtained by accident was speedily repeated and verified, and the discovery was a success.

Daguerre's method has passed out of use, superseded by simpler, better, and more effective processes, no portion of his discovery being retained or utilized in modern photography. The process of Niepce is still utilized for engraving purposes, his experiences being of more use in the present day than that of Daguerre, which is now little more than a beautiful memory. Daguerre, however, received a pension of six thousand francs from an appreciative Government for his brilliant discovery, whilst Niepce died without reward or honour. The posthumous honour proposed by his townsmen was legitimately earned, and we hope the project will be successful.

In reading such scraps of information as remain in relation to Nicephore Niepce, it is impossilble to avoid a regretful conviction that he was a saddened and disappointed man. Toiling with patience in pursuit of his great idea from 1814 to 1824, without satisfactory results, he succeeded in the latter year in producing permanent pictures.

But his success did not bring him appreciation; and in 1827 he turned his back on France, and looked to prosperous and scientific England to recognize the great discovery he had made. But, alas! with that unaptness for affairs which is too often the accompaniment of genius, he could not comprehend certain small imperative necessities in carrying out such a transaction as that at which he aimed. He sent examples of his work to the Royal Society, the countenance and aid of its distinguished members involving, in his conviction, the certainty of success. But he could not comprehend, or was unwilling to accept, the condition, that such a society could not examine or pass an opinion upon a secret process, and he was unwilling to explain his secret and submit the whole matter to their attention. Patent law, bad as it is now, was much worse then, and he did not avail himself of its aid, but, with a sense of ill-usage and injustice, carried his secret back to his home, and devoted himself once again to bootless experiment. Possibly, had his process been then published, twelve years before that of Daguerre or Talbot, it might have given rise to other developments, which might have changed the current of photographic history. At present his work is little more than a link in that history; but we hope his townspeople will succeed in erecting a statue to his memory.

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FRENCH CORRESPONDENCE.

Banquet to the Jurors on Photography at the Paris Exhibition—Janssen's Work on Solar Photography—Dry Plates by Andreux—Hygienic Conference at Paris.

Banquet to the Jurors on Photography.—Since the date of my last letter, an event of the highest interest to our art has happened at Paris; I allude to the banquet given by the Societe Francaise de Photographie and the Chamber Syndicale des Photographes to the foreign members of the International Jury of Class XII. in the Universal Exhibition. This social reunion took place in the beautiful rooms of the Hotel Continental, which has lately been erected on the former site of the Ministry of Finance; it was attended by more than one hundred persons, and was presided over by M. Jules Simon, ex-minister, and president of Group II., to which Class XII. belongs. Among those who accepted the invitation to this banquet were many men who occupy the highest position in science, art, and manufactures, as well as some of the best known representatives of the photographic art from all countries. I shall confine myself to enumerating M. Peligot (member of the Institute), M. Dietz-Monin (Director of the French Section of the Universal Exhibition), M. George Berger (Director of the Foreign Sections), Baron de Watteville (Director of the Department of Science and Literature in the Ministry of Public Instruction), M. Davanne (Vice-President of the French Photographic Society, and member of the Jury of the Exhibition), M. Berthaud (President of the United Chamber of Photographers), M. Leon Vidal, M. Victoire (of Lyons), M. Liebert, M. Franck, M. Levy, M. Reutlinger, M. Rousselon, M. Truchelut; and, among the foreigners, M. Hornig (President of the Photographic Society of Vienna), Mr. England, Mr. White, M. Levitzki, M. Luckhardt, M. Lecher. I had also the honour of receiving an invitation, but was prevented from accepting it from the same cause as has compelled me to discontinue for some weeks my letter in the Photographic News—by an unfortunate illness which has confined me to my room. The banquet, according to unanimous accounts, was a magnificent success, owing to the zealous labours and ability of those who arranged it; and chief among them, M. Truchelut, the Vice-President of the Chambre Syndicale, deserves to be specially mentioned. In the excellent speeches delivered after dinner, justice was done to the progress of our art, and to the men who have helped to realize it; the living as well as the dead had their share of the tribute—Niepce, Talbot, Poitevin, received one after another the grateful testimony which in every respect their important labours deserved. It is to be wished that reunions of this description should be repeated; they offer to all great advantage, if it be only in establishing between members of the same profession ties of sympathy, and in giving an opportunity for an interchange of ideas all directed to the same end.

The Solar Photography of M. Janssen.—In an important communication to the French Photographic Society, at its meeting of the 9th July last, M. Janssen, member of the Institute, and director of the Observatory for Physical Astronomy at Meudon, drew attention to the remarkable observations that he has made during the course of his labours in solar photography. He has succeeded in obtaining photographic images of the sun, showing a disc of about 50 centimetres in diameter, and revealing details concerning the constitution of the sun that, up to the present, have been quite unknown, and more particularly concerning the true nature of the granulations. M. Janssen has been able to obtain these beautiful results chiefly by reducing the action of light to the extremely short space of time of $\frac{1}{3000}$th of a second, and by enlarging the image. But it must not be forgotten that only by the utmost perfection of the photographic art can such pictures be produced. When he first began this work the eminent academician was led to the study of the constitution of the photographic spectrum obtained after a very short exposure. He found that under such conditions the constitution of the spectrum was very considerably altered. More lately M. Janssen has studied the constitution of the photographic spectrum, having for its basis the principal iodides and bromides employed either singly or in combination. He promises to soon afford us detailed information of these spectra; but the point to be kept in mind is this: the extent of the photographic spectrum diminishes with the duration of the exposure, so that with an exposure of a few seconds, or fraction of a second, as the case may be, the spectrum may be reduced to a band situated near to the line G of Fraunhofer's spectrum. We shall not fail, as soon as M. Janssen has communicated the results of his observations of these interesting facts, to bring them to the notice of the readers of the Photographic News.

Andreux's Dry Plates.—M. Maurice Andreux, a medical student at the Faculty of Nancy, and a young amatuer photographer who has for several years been very active in his researches with dry collodion, has sent us the formulæ of a process which he works with considerable success. It may be briefly described as follows:—For the collodion take

Ether	300 grams
Alcohol of 40°	75 c. c.
Pyroxyline	4 grams

Of the last named 2 grams must be of the friable kind, and the other 2 grams tenacious. To 100 c. c. of this solution is added 19 or 20 c. c. of the following:—

Alcohol of 40°	100 c. c.
Cadmium bromide	6 grams
Cadmium iodide	8 ,,

The plates, having been first gelatinised (use a 2 per mil. solution of white gelatine without acetic acid), are coated with this collodion, and then sensitised in an 8 per cent. bath slightly acidulated; each plate is then washed for from three to five minutes until it has lost all trace of greasiness. After being sensitised, the plate is coated with a solution of tannin, of which the formula is:—

Tannin	3 grams
Filtered water	100 c. c.
Gum-arabic	1 gram

This preservative is flowed twice over the plate. Before using the plate it must be dried, and for this purpose it is placed on a sheet of blotting-paper, the upper edge being made to rest against the wall. When they have been thus prepared, the plates are kept in a grooved plate-box. The time of exposure will vary from 15 seconds in the sun, to 45 seconds in the shade, with a landscape camera whose objective has a focal length of 20 centimetres, and its diaphragm an aperture of 12 millimetres. For developing, these solutions are made:—

A.—Transparent sesqui-carbonate of ammonia	Excess
Alum	10 grains
Water	100 c. c.
B.—Alcohol of 40°	100 „
Pyrogallic acid	10 „
C.—Filtered water	100 „
Potassium bromide	2 grams

Then take 100 c.c. of rain or distilled water, and pour into it 2 c.c. of solution A, 4 drops of B, and 4 drops of C. Stir, and flow the mixture over the exposed plate, which has been previously laid in a pan. In from ten to forty seconds the image will make its appearance. As soon as the details are faintly visible, the plate is washed, and placed in another pan; then into this second pan is poured a fresh solution composed of 100 c.c. of distilled water to which, directly before using, 20 c.c. of the following solution has been added:—

Water	300 c.c.
Glacial acetic acid	20 „
Pyrogallic acid	2 grams
Silver solution of 2 per cent. ...	2 c.c.

No pretence of novelty is claimed by M. Andreaux for this process; but he maintains that by this modification of the tannin process, which he has long and successfully employed, he obtains excellent results, both in respect of the sensitiveness of the plate, and as regards the intensity of the negative.

Proposed Hygienic Congress.—It is announced that a sanitary congress will be held at Paris in the course of a few days. The name of Dr. Napias, which appears on the list of the promoters of this congress, gives us reason for hoping that the questions relating to the photographic profession will not be lost sight of. Every one will recollect the practical and exhaustive essay from the pen of this sanitary writer, which appeared in our journal, the *Moniteur de la Photographie*, and which was subsequently translated for the Photographic News.* As a matter of course, we shall take care to make the readers of your journal acquainted with everything that can be of interest to them which transpires at this congress.—Ernest Lacan.

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THE BACKGROUND AND ACCESSORIES.

BY W. HEIGHWAY.

Too often neglected and yet more often unskilfully used, the background has played a very inglorious part in photographic portraiture.

The most artistically posed portrait, on which the greatest skill and care of manipulation have been expended, perfect in light and shade, and composition, would be most seriously marred by an ill-chosen or clumsily used background, while its excellences may be brought out and enhanced by one of suitable arrangement in the balance of light and darks. Indeed the background holds a most important place where artistic portraiture is in question, the more especially where, as in our pictures, there must of necessity be a large unfilled space.

How content the photographer has been with the background of one even tint, so long as it was smooth and unsoiled! Yet nothing could be so antagonistic to Art, nothing so destructive of richness and breadth; nothing could so effectually secure a flat, inlaid appearance to the figure, as this same even background.

Gradation of tint naturally pleases the eye, because it is true to nature. It is, indeed, difficult, under ordinary circumstances, to find in nature any mass of colour without gradation. Charming to the eye as a realization of truth, and owing more to this than to any other of its qualities, gradation is to colour what curvature is to lines, and of it come a vitality and interest which are recognized of the mind as by instinct.

We can here hardly consider definite rules for the management of the background, for in this so much depends on the mind of the artist; but a few suggestions from the practice of painters may be of service.

Perhaps the most general treatment which has been adopted by portraitists is that of relieving the darker side of the face by light on the background, and the face's light side by darks. Often may be found on the side whence emanates the light a mass of deep shadow on the upper corner of the background, this being graded down to a light tint at the lower corner of the other side of the picture, to be opposed by accessories in deep shadow, whereby harmony is maintained and stability secured.

The object to be attained in the arrangement of the background is relief to the figure, and that it should aid the effect of breadth in lights and darks; failing this, the background, or your arrangement of it, is at fault.

Sometimes the proper degree of relief has been secured by joining light to light, dark to dark; and there can be no doubt that, skilfully managed, this principle is one very true and charming. Great care must, however, be exercised that the outline is not entirely lost, and that the interest is sufficiently directed to the figure.

In the posing of the single figure especially is it necessary that the background should have this gradation of tone, as in photography there is such a plentiful lack of interest, and in general a large dreary waste of blankness that would be trying to any figure. With groups there are possibly more motive and interest, and less unfilled space. One of the most difficult things in photography is to pose a full-length figure; it is still more difficult to do so satisfactorily without the aid of accessories. The background ought to keep the lower part of the figure in harmonious shade, and direct the attention to the head.

Pictorial backgrounds are, whatever amount of interest they may possess, and perhaps growing out of this interest, extremely dangerous toys to the average photographer. There is the chance of their being misused, and the greater danger of being overused.

There is perhaps no stronger evidence of the frailty of poor human nature than to see a photographer drag a new background into every picture. We ought really to practise a little self-denial.

The scenic background should not ever be sharply outlined. Suggestiveness and breadth of light and shade are all that is required, and with such a background there is no danger of loss of interest in the figure.

Guard against so arranging your background as to give the appearance of the foliage or rocks sprouting from the head of the figure. I have seen a head so placed, close against a hard, sharply defined tree, that the head seemed to be designed to do service as a flower pot. As a portrait, it was rather a failure. A mountain peak or a pillar are also somewhat out of place.

These little playfulnesses are really neither to the advantage of the head nor to the background.

Be careful that the lines of the background are arranged to run towards that point of your picture which is of most importance, else you will find that not alone do these lines lose the power they have of heightening effect, but detract from it, in calling the attention to points of minor interest. See, too, that the direction of light on the background corresponds with that thrown on the sitter.

Photographers have certainly largely developed imitativeness, and this is all very well so long as it is directed by knowledge to select the good and discard the bad; as it has been, not apparently possessing very great discrimination, they

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* Reprinted as a tractate, and sold by our Publishers.

> "Play such fantastic tricks before high heaven
> As make the angels weep."

It has generally been the case that the worst in the practice of painters, photographers have seized upon and carried to a bitter end. Much that the brush could represent with some show of naturalness is, in the photographic treatment, simply absurd; as, for instance, that ridiculously impossible column against which all England has leant.

Vertical lines are all very well in a composition, but, as introduced in the lines of the hard and unsympathetic fluted column of the accessory maker, can serve no other purpose than to ruin any picture into which they may be brought.

The balustrade of eccentric design, marvellous perspective, and exhibiting the terrible evidence of how wrong light and shade may go under the force of bad example, has also proved a dreadful accessory. These painted things were generally out of keeping with the natural light we threw upon the model, and thoroughly irreconcilable. They are, happily, now things of the past; but we have others in their place, not so frightful, perhaps, in natural ugliness, but equally dangerous, as inducing a sameness of treatment and universality of introduction.

It really seems marvellous how it could have been possible that photographers should find heart to attempt to dispel the very innocent illusion of their scenic backgrounds by the use of baseboards; yet, judging from pictures dating back a few years, this seemed the almost universal usage. It certainly did not improve the chance of the cold sea-shore, or the deep forest with the church spire standing out from its midst, making you believe they were the real things.

Then, again, with the pedestal, balustrade, or the walls of a room—how was it possible to be cheated into the idea of their reality when they were placed over a carpet of loud pattern? There seemed to be so little thought or care for probability that the carpet often was made to serve for green sward and the silvery sand of the sea-shore;—perhaps as a precaution against rheumatism.

The curtain—a most useful accessory if only used with proper skill—has been most awfully abused, being introduced in the wildest and most reckless fashion into pictures with open-air backgrounds, as well as doing its worst in indoor scenes.

While speaking of the curtain, let us note how useful it may be made as a means of supplying necessary lines of balance, and directing the attention to any given spot. However, too often we find how mischievous it may become in emphasizing an unimportant feature, or one it were better to subdue instead of drawing into prominence, as, for instance, the hands.

At the present time our great snare is in the high-backed posing chair—not because it is in itself at fault, but that it has been too much used. It seems to be the idea that grace is only possible in a lolling position, or in acrobatic contortion over the back of this much-abused posing chair.

Variety in respect of accessories should be looked to; and it were well to have a number of chairs of different patterns and good designs. A long, oval table, light, and fitted on castors, will be found serviceable, another with square lines, and, if possible, a handsomely carved oak table for occasional use. Many of the chairs and tables now made in imitation of the so-called "Queen Anne period" will be found to answer the photographer's purpose very admirably.

Footstools of various sizes and designs should, too, be included among the number of the accessories of the studio, being especially useful at times in grouping.

Rock, and rustic accessories, may also find place; and with this a rush matting in place of the grass, and a few small knots of wood and imitation leaves to come in the foreground, will be found most useful. But do not overdo this effect.

The gentleman sitting on a gate has been a by far too-familiar object in photography, and it is almost time some other out-of-door occupation should be found for him.

It is quite impossible to tell you *what to do* with accessories, because everything depends on the character of your model, so that we must be content to study what to avoid as ridiculous, or hackneyed, or out of keeping with the motive of the picture. If you desire the introduction of a seat where the model is by the seashore, a drawing-room chair would scarcely be the accessory you would select, nor would a curtain be strictly harmonious with the suggestion of a forest glade. But, perhaps, we have got beyond these little incongruities.

BOISSONAS' RAPID PROCESS.

[OUR Philadelphia contemporary gives the following as the "Lambert Lightning Process," which is the name by which Boissonas' process is known and sold in the States. Our readers will see it is like the play of "Hamlet" with the part of the Prince of Denmark left out. There is no process given.—ED. P. N.]

Albumenizing.—Albumenize your glass as usual.

Collodion.—The lightning negative collodion will keep indefinitely, and is sent ready for use. Carefully coat the albumenized plate, allowing the film to become well set before immersion in the bath. Keep the plate in motion in the bath, and remove it as soon as the greasy lines have disappeared. The dark-room must be *absolutely* free from all actinic light. To have the maximum of rapidity the plate must be exposed as soon after removal from the bath as possible. Filter and thin the collodion as usual, if necessary.

Bath.—Usually the first bath sent is of proper strength, and ready for immediate use; afterwards it will be sent in concentrated solution. Test it, and dilute it with distilled water or ice water, so as to make forty grains to the ounce, keeping a little of the concentrated solution to strengthen the bath when necessary to keep it at forty grains to the ounce. After the bath has been in use for some time it will naturally deteriorate, from the absorption of alcohol and ether and an excess of iodides. It should then be rendered alkaline with liquid ammonia or weak cyanide of potassium, adding distilled water equal to one-half the quantity of the solution, and evaporate in the usual way to its original quantity; then expose to the sun until all precipitation ceases, and when cold filter twice through clean filters. See that the bath is in strength forty grains to the ounce, or make it so by adding either distilled water or some of the reserved concentrated silver solution; also add sufficient C. P. nitric acid to show the slightest trace of acidity on blue litmus paper after one minute's immersion; for the bath works best when as nearly neutral as possible.

Should the plate be *fogged*, try to remove it by rubbing lightly with the fingers; if it comes off it is a proof that the bath is too acid, so treat it with liquid ammonia or weak cyanide of potassium. If the fog is in the body, and cannot be rubbed off, it is evident that the bath is too alkaline; then treat it with a little C. P. nitric acid.

Developer.—This developer will keep indefinitely, and must be mixed with its own bulk of distilled water before using. The development must be continued as long as possible, being unusually slow; it will take up again any precipitation without injury to the negative. Use just enough developer to cover your plate. Some photographers catch their developer in a tray, and after filtering it use it over again without any bad results. Should the subject have required an unusually short exposure, allow the plate to remain in the holder a few minutes after exposure before development. If the picture flash out suddenly in the development, throw off the excess of developer, and rock the plate quickly until the proper density is obtained. Should the picture develop with too much hardness, reduce the strength of the developer.

Fixing.—Fix in hyposulphite of soda, as usual; but if the negative look too hard, a dash of cyanide of potassium will soften it; but it must be used carefully, and not too long.

Continuator.—The continuator is rarely needed, but if so, add to it an equal quantity of water, and a few drops of a ten per cent. nitrate of silver solution at the moment of using. It is only used after development, to bring out the details of an under-exposed negative when the developer fails to do so.

Re-intensifier.—Very seldom necessary, being only used to obtain greater intensity, when it takes the place of the continuator. Dilute i with five times the quantity of water, and add, at the time of using, a few drops of a weak silver solution. It should be used carefully, as it gives a very strong colour.

N.B.—Be careful to have the glass perfectly clean, as foreign organic matter causes fog and stops detail in development.

[We give the above according to promise. It is genuine, as supplied for $20, by T. S. Lambert.—Ed. *P. P.*]

[As we (Ed. Photo News) understand the matter, these are the instructions for the use of secret materials supplied. They contain no secret, but are interesting as showing that no unusual manipulations are required.]

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A NEW METHOD OF PRINTING BY PHOTO-LITHOGRAPHY OR PHOTO-ZINCOGRAPHY.

BY CAPTAIN HANNOT.*

The process which we are about to describe is a combination of the one invented by the Dutch Captain Van der Beck, and that of Toovey.

By means of it we can overcome the difficulty of preparing the paper presented by the latter process, and avoid the inconvenient method of inking used in the former.

A sheet of ordinary albumenized paper is floated for five minutes, with its albumenized side upwards, on a concentrated solution of potassic bichromate, and then hung up to dry. When dry, it is exposed beneath a negative, and then again floated, with its right side downwards, on water to which a little solution of ammonia has been added. It is allowed to remain in this condition, but protected from light. The water will penetrate the paper sufficiently to dissolve the compound formed by the gelatine and the potassic bichromate in those places where the light has not acted. This bath is renewed three or four times, and on each occasion a small quantity of ammonia is added, until the water arrives at the surface of the print and remains there, a stage which is recognized by the water of the bath no longer turning yellow; it is then immersed completely in the water, and rinsed as long as may be necessary.

The picture thus obtained is transferred to stone or zinc in the following way:—

The print is laid with its printed side downwards on a lithographic stone, or on a plate of zinc, either polished or finely grained, according to the nature of the picture which is to be reproduced; over it is stretched a sheet of paper coated with gum-arabic, and, over this, one or two sheets of blotting-paper slightly damped. The stone or zinc plate must have been previously arranged in a percussion press, and when thus charged is submitted to strong pressure.

In consequence of this pressure the moisture of the blotting-paper is made to penetrate the film of gum-arabic; and this, dissolved by the water, passes through the print, and is deposited on the stone or zinc plate, except in those places corresponding to the lines of the image, because the insoluble substance of which they are formed prevents the passage of the gum. By this means, when the stone or zinc plate is withdrawn from the press, and the print removed, there remains on the surface of the stone or of the zinc plate a negative picture formed of gum-arabic. The unaffected, or rather non-gummed, parts constitute a picture identical with that of the original negative.

Usually the effect required is produced after from fifteen to twenty minutes' pressure. After gumming the edges the stone or plate is allowed to dry thoroughly, and then the fatty ink is applied to its surface with a roller. The fatty body will penetrate the stone or zinc plate only in those places which are unprotected by the gum-arabic—that is, in the lines corresponding to those of the original picture. Thus the transfer to stone or zinc will be found to have been effectually carried out. The stone or plate, after being washed in essence of terebinth, is rolled up with ordinary printing ink, and an unlimited number of impressions may be pulled in an ordinary lithographic press.

To coat a sheet of paper with a film of gum-arabic, the gum is dissolved in water in the proportion of 20 grams gum to 100 cub. cents. of water. This solution is poured into a shallow pan, which is slightly inclined, so as to bring all the liquid towards the side nearest to the operator. Into this is introduced a glass rod, and the paper is immersed in the solution, and withdrawn by passing it between the rod and the edge of the pan. By this means it is soaked with gum, while the rod prevents the formation of air-bubbles on its surface. The sheet of paper is then hung up, and allowed to dry. If, when dry, it is found to be much thicker at the lower than the upper end, it must be again plunged into the solution, care being taken, in withdrawing it and hanging it up to dry, to maintain it in an inverse position.

The moistened sheets of blotting paper must be prepared half an hour beforehand; it is done by damping some with a sponge, and inserting dry sheets between them, when they will be soon found to be evenly and equally moistened.

The advantages offered by this new method of photo-lithographic printing may be summed up as follows:—

The manipulations required for preparing the sensitive film are very simple.

It is not necessary to transfer the prints to the stone or zinc at once; this operation may be postponed indefinitely, and can be carried on in open daylight.

The sensitive film being exceedingly thin, and very closely attached to the paper, there is no fear of seeing the more delicate lines of the picture effaced when it is washed to remove the soluble portions that remain.

Lastly, the picture on the stone or zinc, being formed in fatty ink, which is applied exactly as in ordinary lithography, remains perfectly good for pulling proofs, and this can be done by any ordinary printer.

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ON GRAINED PHOTO-LITHOGRAPHS.

BY DR. J. SCHNAUSS.*

As an appendix to my article, translated from the *Photographisches Archiv* (see Photographic News for 14th June, page 278), I am anxious to draw the attention of the readers of that journal to a new process for producing pictures with a grain on the lithographic stone. The inventor of this process, Professor Husnik, who has authorised me to make it public, employed his own photo-lithographic transfer paper.

Take a fine ground glass plate, and rub it in with soft, yielding, and fatty printing ink, the same as is used for copper-plate printing; rub off the ink with a coarse but firmly-woven cloth, so that it remains in the depressions only. Place the plate in a horizontal position, and flow over it a solution of gelatine (1:10), with the addition of 3 parts alcohol and ⅙th glycerine; let it dry, and then draw off the gelatine film, which will be found to contain a fine grain. It must be kept between the leaves of a book, as it is very liable to injury. To copy the chromatized photo-lithographic paper, lay the film on the smooth side of the negative, and the paper on the film, and expose four times as long as in the ordinary process. The further manipulation of the paper is as usual, only in wiping off the ink with a fine, soft sponge, the greatest possible care must be taken not to injure the graining. Before developing let the paper soak in cold water for a little longer than is generally necessary, so that with the least pressure the ink may be removed from the parts that have been acted on by light. The shadows must be developed with a rather stronger pressure by means of a piece of new sponge cut to a point; but care must be taken to avoid touching the lights. This process is more especially well-adapted for larger pictures.

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* *Bulletin Belge.*

* *Photographisches Archiv.*

Correspondence.

MANUFACTURE OF PHOTOGRAPHIC PAPERS.

Dear Sir,—Could not one of our English paper makers be induced to manufacture paper suitable for photographic purposes? It would be a great boon, for Saxe paper is far from perfect, and Rives has gradually degenerated, and is now not at all reliable for printing photographs upon. Rives paper has always been liable to iron spots, and has lately become ten times worse than ever. There may be applied to them what has been said of a certain obnoxious insect—

> "They used to come by twos and threes,
> But now they come by swarms."

Yours truly, C. Durand.

[For calotype purposes, English manufactured papers were found to answer best; but for modern printing, they have not hitherto been found so good as the French and German samples.—Ed.]

Proceedings of Societies.

Edinburgh Photographers' Holiday.

The annual holiday under the auspices of the Edinburgh Photographic Society came off on Thursday, the 18th instant, the locality chosen on this occasion being the beautiful grounds surrounding Winton Castle, the quaint picturesque residence of Lady Ruthven. As, year by year, the advantages of such holidays become more and more recognized, the labour of the acting committee in bringing about something like a general closing of the establishments in the city is found easier and easier, and on this occasion a very close approximation to a universal suspension of business was attained. The original object of the institution of the holiday was to afford an opportunity for employer and employed to meet together on equal terms in the enjoyment of social intercourse at least one day in the year; and with the view of inducing as many as possible to join the excursion party, it has always been the aim of the committee to afford the best possible entertainment at the smallest possible cost. How well they succeeded in the present case, may be gathered from the fact that for a payment of 7s. 6d. and 5s. for gentlemen and ladies respectively they gave conveyance to and from Winton, luncheon, dinner, and tea, including an unstinted supply of liquids ranging from soda-water to champagne—so unstinted, in fact, that even some of the latter was taken back to town. Food for the mind was also provided by a string band, which at intervals discoursed sweet music; and prizes to the value of over £10 were given to successful competitors in athletic and other games.

Of course, on all such occasions there are many who, when such an opportunity occurs, prefer to visit friends or relations, or to go off somewhere on their own hook; but, notwithstanding that, the party numbered 105 when it assembled at the Waverley Station. At 9·30 they started in a special train, and had a pleasant run to Winton Station. Winton Castle is a picturesque building of the time of Charles II., with some modern additions not by any means so picturesque. It contains some exceedingly fine carvings and mouldings, and a series of perfectly unique chimneys of exquisite workmanship, and is surrounded by many fine large trees and extensive shrubberies that afforded most grateful shade from the intensely hot sun.

The party were assembled in front of the Castle, and the President, through whose influence permission to visit the grounds had been obtained, briefly intimated the orders of the day, and in the name of Lady Ruthven gave them a hearty welcome. Her ladyship, he said, regretted very much her inability to be present, and had even wished the meeting postponed for one day, to enable her to be so; but as that had been found impossible, had asked him to give them the welcome he now did.

A substantial luncheon commenced the business of the day, and then the party broke up into groups, each betaking themselves to the kind of amusement that pleased them best; the younger members going heartily in for the various games under the management of Messrs. Pringle, Bashford, Mathison, and Wishart, or being tempted to join in the dance; while the more elderly preferred to recline in the shade listening to the music, and watching the ever-changing gaiety of the scene.

At 1.30 two groups were successfully taken by Mr. John Annan, and the party sat down to dinner with the President in the chair. Mr. Pillans was, as on several former occasions, purveyor, and discharged the duties to the satisfaction of all concerned, everything being of the best quality, in ample abundance, and well and promptly served.

After dinner the President said that this was neither the time nor place for much or lengthy toasting, but as patriotic Scotchmen, who thoroughly appreciated the liberty which they enjoyed, and who loved their Queen with all the heartiness of a loyal people, they could not rise from the table without the time-honoured toast. He then proposed the health of the Queen and all the members of the royal family. The toast, as usual, was enthusiastically responded to, followed by the singing of two verses of the Royal Anthem.

Mr. J. G. Tunny said the only other toast was that which he had been asked to propose, viz., prosperity to the Edinburgh Photographic Society. He thought it unnecessary to say a word on behalf of the toast, as the Society and its work were as well known to most of those present as to himself. It was a satisfaction to all connected with it to know that, although getting up in years, there were no visible signs of decay, and that it was one of the most useful and hard-working societies in existence. Not the least important of the many good works that it had done in its time was the inaugurating, and year by year carrying through, the annual holiday; and for this, if for nothing else, it deserved the warmest thanks of all concerned. He begged to couple the toast with the name of Mr. Lessels the President, to whom the Society was deeply indebted for many favours, and who had been one of the best presidents they had ever had. The toast was received with acclaimation, and in reply the President said he undertook the duties of the office with much doubt as to his ability to discharge them properly, but in consequence of the courtesy of the members generally, and the ever ready help of those more intimately acquainted with the work of the Society, he had found less difficulty and more pleasure than he expected.

After dinner the games were resumed, and the amusements generally carried on with unflagging energy. The whistle sounded for tea at five o'clock, but "the cup that cheers but not inebriates" did not seem so much in favour as the previous meals, as it was with difficulty the party were gathered together for the presentation of the prizes at half-past five o'clock. This was, however, at last accomplished, and the prizes were presented by Mrs. Lessels, as follows:—

Bowls—1st prize. Gentleman's silk umbrella, W. D. Young; 2nd. Gentleman's sporting knife, G. N. Campbell. Skipping rope—1st prize. Ladies' companion, Miss Davies; 2nd. Silver pebble cross, Miss Johnston. Battledore—1st prize. Handsome ladies parasol, Miss McGregor; 2nd. Album, Miss Finlayson. Spelling Bee—1st prize. Stereoscope and one dozen slides, Mr. Hannah; 2nd. Book, Miss Finlayson. Ladies race—1st prize. Ladies' companion, Miss Ann Calder; 2nd. Silver pebble cross, Miss Calder. Gentleman's race (150 yards)—1st prize. Album, Mr. Calder; 2nd. Large photograph, Mr. W. Mathison. Hop, step, and leap—Concertina, Mr. Maclean. Sack race—1st prize. Water-colour drawing, Mr. W. Mathison; 2nd. Framed picture, Mr. W. D. Young.

Probably the most interesting feature of the day was the "Spelling Bee," which was admirably managed and well contested, the excitement towards the close being very great. Miss Finlayson and Mr. Hannah were well matched, and came through a rather severe ordeal, with many words not frequently met with. The lady ultimately making a slip by doubling the l in stalactite.

At 5·50, the order to march was given, and at six o'clock the train left Winton Station, and rapidly carried the party to Edinburgh, all highly delighted with the proceedings of the day, and feeling that another success was scored in favour of the Photographers' Annual Holiday.

Talk in the Studio.

Composite Beauty.—*Funny Folks* has the following in reference to a paragraph which appeared in our last:—"There is a popular French artist, M. Cabanel, who seems to have caught his method of working from Horace's famous satire. He gives his sitters what charms he likes. Thus, ladies have become renowned for having wonderful hair, beautiful eyes, pearly teeth, and lovely arms, not because they really possessed these things, but because the artist thought they ought to have them, and so 'threw them in.' M. Cabanel's process may be thus rendered from the opening lines of the famous epistle, 'Ad Pisones, de Arte Poetica:'

"And who dare laugh, though Cabanel may trace
Each lacking beauty in the flatter'd face;
Give gold for silver tresses; change the tint,
Plump the thin lips, to languor turn the squint,
Choose from a store of shoulders, necks, and arms,
And paint a portrait of assorted charms?"

To Colour Photographs. - The *Scientific American* says:—"Take a strongly printed photograph on paper, and saturate it from the back with a rag dipped in castor oil. Carefully rub off all excess from the surface after obtaining thorough transparency. Take a piece of glass an inch larger all round than the print, pour upon it dilute gelatine, and then 'squeegee' the print and glass together. Allow it to dry, and then work in artist's oil colours from the back until you get the proper effect from the front. Both landscapes and portraits can be effectively coloured by the above method without any great skill being required."

Photography in Colours.—An ingenious foreigner claims to have invented a process of printing in colours based upon photography, which has been tortured by newspaper scribes into the sidehead "Photography in Colours." He prepares three sensitive films, each capable of being affected by one of the primary colours. By exposing, developing, and transferring to plates of chromated gelatine, he gets three "formes," so to speak, which are worked in red, blue, and yellow, just as if they were three colours of a zylograph. The picture thus produced is said to accurately resemble the original, but we have very serious doubts as to the exact reproduction of colours in this way, and are disposed to think that the chromo-lithograph will not be driven out of existence by the chromo-photograph just yet.—*The Paper and Printing Trades Journal.*

Copyright Pictures.—Those of our readers who sell artistic photographs will do well to bear in mind that in the case of copyright pictures, such as the "Last Kiss," and "Grace Darling," the *seller* of a pirated photograph is liable to fine and imprisonment, as well as the actual pirate. A little care in purchasing stock will, therefore, not be thrown away. A fine of £5 was recently imposed by a London police magistrate upon a person who sold only a single copy of one of the pictures mentioned.—*Ibid.*

Making Paper Transparent.—Artists, designers, decorators' architects, land surveyors, and all who have occasion to make use of tracing-paper in their professional duties, will be glad to know that any paper capable of the transfer of a drawing in ordinary ink, pencil, or water-colors, and that even a stout drawing-paper, can be made transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper be damped with pure and fresh distilled benzine, it at once assumes a transparency, and permits of the tracing being made, and of ink or water-colours being used on its surface without any 'running.' The paper resumes its opacity as the benzine evaporates, and if the drawing is not then completed, the requisite portion of the paper must again be damped with the benzine. The transparent calico on which indestructible tracidgs can be made was a most valuable invention, and this new discovery of the properties of benzine will prove of further service to many branches of the art profession in allowing the use of stiff paper where formerly only a slight tissue could be used.—*Scientific News.*

Photograph and Phonograph.—The phonograph has already been put to a practical use, according to *Mayfair*, which states that the following story is good and quite as true as need be. A well-known manager received a few days ago a letter from Paris enclosing the photograph of a lady, and what appeared to be tinfoil neatly folded up and curiously indented. The letter was to this purport—"Sir,—I enclose photograph of myself in *La Traviata*, and specimens of my voice. Please state, by wire, terms and the date when I can appear at your theatre. I have the honour to be, sir, yours,—F.B." The poor manager, whose scientific education had evidently been neglected, was puzzled. The photograph showed a lady of attractive presence, the letter was to the point, and the spelling American. But how to discover a lady's voice from tinfoil curiously indented passed his comprehension. He consulted his friends, one of whom had seen the phonograph at the Crystal Palace. An adjournment to that popular resort was unanimously voted. The foil was adjusted to the instrument, and after a few revolutions of the machine the notes of "*Ah fors' è lui*" resounded with crystalline clearness. An immediate engagement of the lady was the natural result.—*Family Herald.*

To Correspondents.

W. W.—We should consider the gloves quite safe to use for either development or fixing; but not the same gloves for both purposes, as that might bring traces of the fixing solution into contact with the plate during development. The address you require is 3, Stockwell Terrace, Brixton, S.E.

A. P.—Pyrogallic acid is often injured by keeping: light and air deteriorate it. Its developing capacity depends upon its being greedy of oxygen, and when it has become oxidized it loses developing power. When so deteriorated it becomes discoloured, turning somewhat brown.

L. B. (Queensland Photographer).—We remember the circumstance, and when we called at the establishment last, we received an assurance that the goods had been despatched. If we can now lay hands on the document, we will send it as desired; but we fear that it would be destroyed as of no further apparent use.

Sylvester Parry.—The cards are very nice indeed. The lighting is excellent, and the modelling, consequently, very good. The retouching is managed with great care, and is very effective. Altogether a high class of portraiture. The newspaper cutting describing your studio is very interesting.

Retoucher.—Powdered black-lead is generally used with a stump in retouching the negative.

Rembrandt.—There is no work that we know of devoted to the subject of Rembrandts; but many articles on the subject have appeared in the News and in the Year-Books. The principle upon which their production depends is the use of a strong concentrated light. That is best secured by placing the sitter near to a small window. For the rest, good taste is the best guide, and the observation of good work. 2. The same kind of camera is used for producing ferrotypes as for negatives. But a modification is necessary in the plate-holder of the dark slide. The spring must not press in the middle of the plate, which would be bent. The ferrotype plate may be used in the ordinary dark slide, placing a plate of glass at the back.

F. R. Ryles.—The general plan seems to be very good. We should not make the roof flatter. The Belgian sheet glass is cheapest, and answers every purpose. It is a better colour than the English sheet, but we do not know that it will keep its colour better. We regret that our engagements do not leave us leisure for answering correspondents of the News by post. The tracings have been returned. They did not reach our hands until Wednesday, as, after reaching our office, they had to be forwarded to our residence in Kent.

T. Birtles.—The cabinet portraits you forward are very excellent throughout, and would not disgrace some of the best studios in town. They are infinitely creditable to a self-taught artist, both in technical and artistic qualities. We can see that there is, as you say, very little retouching, and that is very judiciously done. If you continue taking the same care, and taking the same pride in your work, you will reach the highest ranks in the the art.

T. L. P.—Many articles have appeared, both in the News and the Year-Books, on enlarging in the solar camera by development. In the Year-Book for 1864 there is a very good one by Mr. Sydney Smyth, a gentleman for many years professionally engaged in that class of work; and in 1865 there is an excellent article on the subject by Mr. Woodbury.

Several Correspondents in our next.

The Photographic News, August 2, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Photographs upon Silk and other Fabrics—The Specimen Case.

Photographs upon Silk and other Fabrics.—The idea of printing upon fabrics seems to have once more been taken up by the silk manufacturers of Lyons. We have several times, in these columns, given formulæ for the treatment of fabrics—silk, linen, and calico—to prepare the surfaces to receive photographic impressions, from the pens of Mr. Baden Pritchard, Mr. Henry Cooper, and others. The printing of photographs upon fabrics is an industry that has never yet been taken up with energy; and since the exhibition of some parasols at the Pall Mall Annual Exhibition some years ago, we have seen no illustrations of this application. The specimens we refer to were white parasols, having printed upon them an impress of beautiful black lace. A fine specimen of rare lace had been photographed, and the photograph transferred to stone or zinc. The tops of the parasols (before being made up, *bien entendu*) were then impressed with an image in black ink of the lace, and the finished effect was so striking that, until one actually took the parasol in one's hands, and touched it, the deception was not apparent. The price of these parasols, we remember, was but a shilling or two, and yet, as we have said, they had the appearance, covered as they were with rich lace, of being wortb several guineas. The Lyons people seem to have given their attention to printing photographs upon silk, and we are told that some fine specimens of printed stuffs were recently submitted to the French Photographic Society. Among others were some pieces of silk printed with medallions of large size, representing pictures of the old masters. Some of the pieces of fabric thus printed measured no less than forty meters in length.

The Specimen Case.—The specimen case is rather a bad one. It is unsatisfactory enough to have to judge of a man's capabilities only by pictures which he sets before you, but here, at any rate, you have the option of trying him, and then sending him about his business. Where, however, you buy a process, or a camera, or a lens, upon the faith of a picture that is shown, there is little redress to be obtained subsequently, when you find your work goes on no better than before; and yet the exhibition of specimens in proof of the excellence of *materiel* employed in photography is met with everywhere, unsatisfactory as everybody acknowledges it to be. If you are offered a new description of albumenized paper, the dealer generally shows a magnificently glazed print of some charming damsel, and wants you to believe that the magnificence, the glaze, the damsel and her charms, are all due to the improvements he has has effected in the matter of albumenizing. It is not long ago that we had sent us half-a-dozen voluptuous cabinet portraits of American belles, by way of showing off some new-fangled paper we were asked to buy. The same dealer would have had no less compunction, doubtless, in exhibiting similar specimens as a proof of the excellence of the hyposulphite of soda he had in hand, provided he desired to sell some of this fixing agent. And he is quite right, too. If photographers, whether professional or amateur, are satisfied with such proofs, why should there be any other forthcoming? Foreign lenses and instruments, which are sold cheap in this country, are often backed up by specimens of the grandest description, which are supposed to yield proof conclusive of their rapid qualities. Dry plates, again, are an excuse for bringing out pictures which may or may not have been taken upon films of the same kind, and the prints shown are sure to be chance specimens, not proving at all the qualities of the process, you know, but simply impressions which have been picked up at the moment for want of anything better. That is an invariable feature of all examples you are permitted to see. They are never representatives of what the process, or the lens, or the hyyosulphite of soda really can do; they are always a job lot of rough prints which you see, ordinary impressions off a very so-so negative, to tell the truth, such as ought, in fact, never to have been carried outside the printing-room. But it is the secret process-monger who constitutes the best displayer of work of this kind. He is generally so modest. He hardly likes to bring out the prints at all—they are so imperfect. But next Friday week he hopes to bring you something worth looking at, which will really prove the efficacy of the marvellous solution he has to sell, warranted to keep the collodion from slipping off the glass, without the necessity of wiring the film on at all; and then he produces the regular cabinet vignette of some celebrated actress, or non-actress. In your humble opinion, you regard the picture, as it is, as very good—very good indeed; but your visitor deprecates every word of praise, and assures you that if he had not been in such a hurry that morning, he certainly could have brought out with him something worth looking at. But it is the amateur who is more frequently the sufferer. A photographer, hardened by the experience of many years, is only occasionally deceived; but he takes his turn, now and then, like everybody else. The amateur, however, is a lucky man if he does not throw away a score of guineas one way or another, before settling down. His first step is the most perilous of all. He has made up his mind to go in for photography, and he makes the plunge. He does not wish to take anything larger than a cabinet size, and he has seen some pictures of this description, both portraits and landscapes, in a shop window, taken by an apparatus that can be purchased, in cabinet complete, for a ten pound note. How much better, he argues, to buy a complete thing in this way, than to go bothering about selecting apparatus and chemicals. In this case, every parcel and bottle has its label, and everything fits neatly and compactly into the well-polished box. As to the capability of the lens and camera to take pictures, there is absolute proof before one in the charming pictures that are shown, and these are certainly up to what the best professional photographers are capable of securing. So the ten pounds are exchanged for the complete apparatus, and the amateur photographer buys his first bit of experience. It will be some consolation to him to know that his professional brethren have to undergo similar trials.

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LACONICS.

BY WM. HEIGHWAY.

The quality of the negative has much to do with the effect of the picture. I am not now speaking of cleanliness of manipulation, but of thinness and opacity.

The thin delicate negative develops to the full all the beautiful gradations of light and shade, and much finer effects are to be produced by it in the printing.

The thick opaque film does not appear to be so sensitive to the more delicate tones of shade.

The colour of the film, too, has some influence on the printing qualities of the negative, the olive-tinted film producing the best prints. It has never been settled how this colour is obtained, but I am of opinion that it comes where the fixing is done with cyanide of potassium, those negatives fixed with hyposulphate of soda showing a bluer tone.

Retouching has done much, very much, for Art Photography, but that is no reason why it is to be allowed to go to any lengths unchecked. I don't know any process that has proved so valuable, but the evidence of our every-day work is that we may yet have cause to regret its introduction.

We must, with our better knowledge of Art principles, study how far such aids are to be utilized, and not under any circumstances allow them to falsify nature.

I think whatever of Art is put in a picture by the artist, a great deal is taken out of it by the dark room man, more by the retoucher, and still more by the printer.

Reflected light is a very nice thing, and all very right and proper—in its place, and to a certain extent; Nature abounds in reflected light. But when in our studios our reflections are almost as strong as direct lights it is time to cry, "Hold! enough." Reflectors should be used very tenderly, and the effects of the darks guarded very jealously.

The broad effect of dark is very precious a shadow can hardly be too black; where we can see what it means, and certainly when under it the form of the features is defined it wants no lighting up by reflectors.

It is to be feared that the use of the reflector is degenerating into a superstition with photographers.

We, in this first age of the art, are forming the precedents, and our great care should be that they are true, so that those who follow us may not be burthened with a choice collection of mistaken notions, which they will have to forget if they desire to make photography a Fine Art.

Do printers sufficiently endeavour to enter into the intention of the artist, or is it with them merely a question of knocking off so many prints a day?

There are often effects in a negative the beauties of which may be heightened in the printing, or by uncare entirely lost.

I remember an incident related to me by a celebrated dark room man in New York. On seeing a proof from one of his negatives, he expressed dissatisfaction. The printer said the print was the best to be obtained from such a negative. The dark room man thought not, and sent the negative over the way to a rival gallery, and received back a really splendid print. He showed it to his own printer, who had to acknowledge its excellence; but, put on his mettle, declared he could beat *that* print out of sight—and did.

The moral appears to be that, with printers at least, there are *several degrees beyond* THE BEST!

Art printing does not consist in the exhibition of an awfulness of ingenuity in borders.

I have seen them described as *ornamental.* Well, one ought to be very tender with the weaknesses of others, and all that kind of thing, but then one deserves to be well treated for one's virtue in abstaining from criticism, and the only adequate reward is that ornamental borders be banished from the land for ever.

They are not ornamental, and if they were, the photographic portrait is not the kind of art work adapted to borders.

Do not steal the brains of the valentine makers.

There is, too, some little art in mounting a photograph. It makes a great deal of difference in the appearance of the portrait whether the head is placed too high or too low on the card, dwarfing the figure in the one instance, and elongating it in the other. The amount of margin, back or front of the head, also has its effect. Too little in front gives the appearance of the figure walking off, and lack of space behind suggests a retrograde movement.

These are no doubt trifles; but without the study of such little things we cannot get that great thing—perfection.

If you are to do anything really good in photography, you must contrive to have your own way largely.

I don't mean that you are to be obstinate, and self-willed, and rude; but, all the same, you must manage the sitter. Let all your instruction of sitters be of an amiable and persuasive kind, rather than of robustious denunciation of the ignorance of the world in general, and the unfortunate individual who has come to sit to you, in particular. You are not likely to convince any of error by taking them by the throat and trying to shake the nonsense out of them.

It is not always necessary to tell the sitter, who has come to you crammed with ideas as to how he shall sit, that he knows nothing at all about the subject, and that his suggestions are quite worthless—only, gently guide him to *your* way of thinking.

A sitter does sometimes make a valuable suggestion. It is not often, but, "as a stranger, give it welcome."

You are not going to do any work while the sitter has the whole of his or her circle of relatives and friends buzzing around the studio doing the amateur art-critic business. You may just as well expose clean glass until you can induce the whole tribe to go and look at the pictures in the reception room.

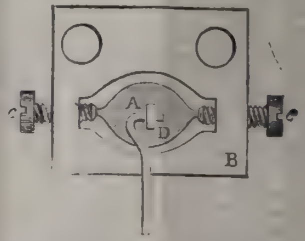
Be tender with babies, and very patient. Be lenient to the little vanities of our poor human nature. Be courteous to all—and look on every sitter as more than worthy your very best Art.

RECORDING ARTICULATE VIBRATIONS BY MEANS OF PHOTOGRAPHY.*

The object of this paper is to describe a method of obtaining photographs of minute vibrations on a magnified scale.

A plane mirror of steel, A, is supported by its axis in the metal frame B. The ends of the axis are conical, and carefully fitted into sockets in the ends of the screws, CC. On the back of the mirror is a slight projection, D, pierced by a small hole.

The vibrating disc, as hitherto employed, is a circular plate of ferrotype iron, 2¾ inches in diameter, screwed to the back of a telephone mouthpiece of the form invented by Prof. John Peirce, and now universally used. From the centre of the back of this disc a stiff steel wire projects, the end of which is bent at a right angle. This wire serves to connect the vibrating disc with the mirror by hooking into the hole in D, as represented in the figure. The mirror frame and the vibrating disc are kept in a fixed relation to each other by a block of hard wood, to which both are firmly screwed. The mirror is set with its axis parallel, and its reflecting surface perpendicular, to the vibrating disc.



A heliostat sends a beam of sunlight horizontally through a small circular opening. This beam passes into a dark closet, and at a distance of several feet from the circular opening falls upon the mirror above described, placed with its axis inclined 45° to the horizon. The rays, reflected vertically downward, pass through a lens at whose focus they form an intensely luminous image of the circular opening.

A carriage moving smoothly on four wheels travels beneath the lens at such a distance that the sensitized plate laid upon it comes at the focus for actinic rays. A uniform velocity is given to the carriage by a string fastened to it, and passing over a pulley. To this string a lead weight, just sufficient to balance friction, is permanently attached, while a supplemental weight acts at the beginning of motion, and is removed just before the sensitized plate reaches the spot of light above described.

The velocity attained by the carriage is determined by placing a sheet of smoked glass upon it, and letting it run under a tuning-fork (Ut 3—512 v. s.) provided with a pointed wire. In every case more than 200 vibrations

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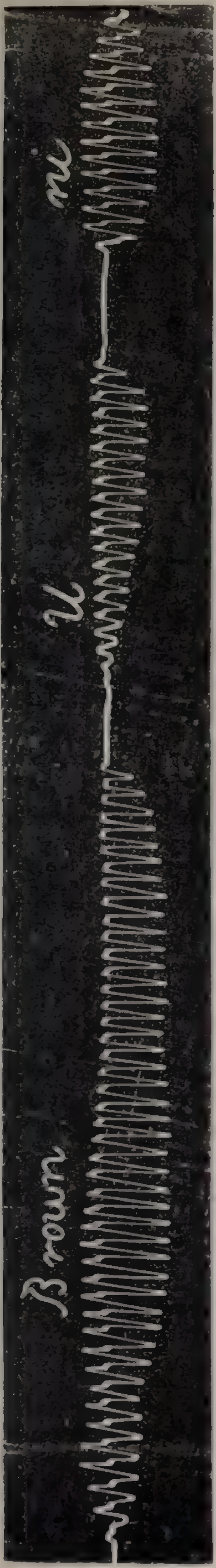
* The text abridged for *Nature*, by Prof. E. W. Blake, of Brown University, from a paper in the *American Journal* for July. The illustrations (except mirror) from photographs supplied by Prof. Blake.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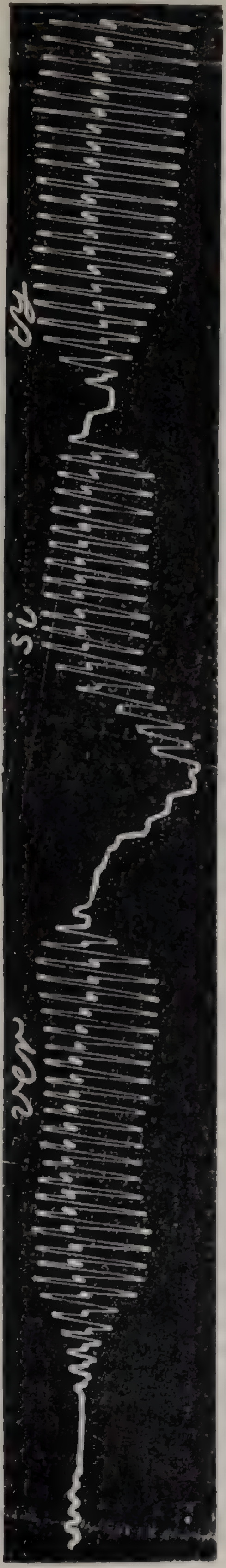
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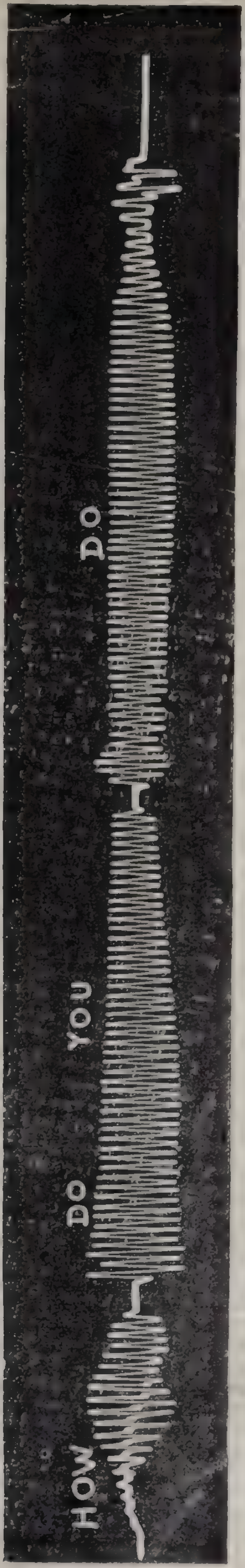
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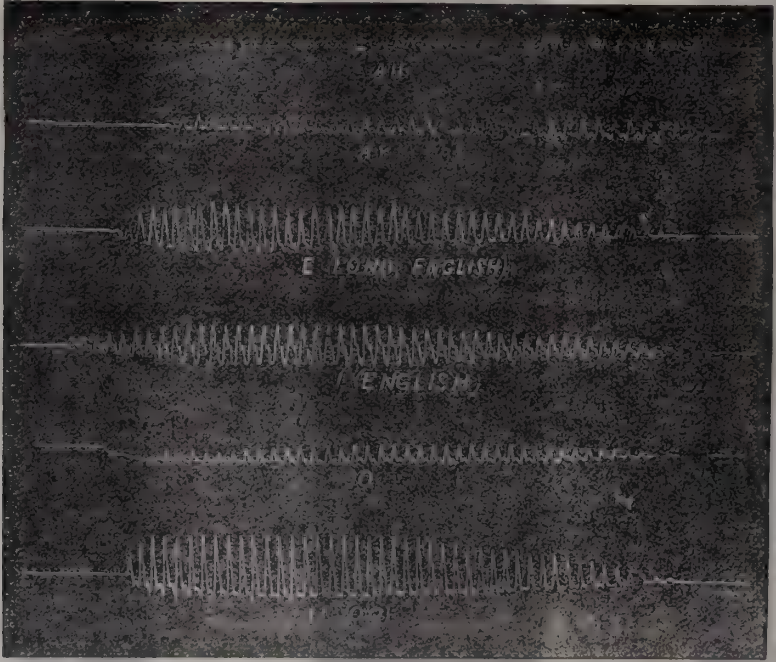
were counted and measured, and careful comparisons made between the earlier and later ones, so as to be certain of the uniformity of the motion.

From the description it will be evident that when the carriage alone is in motion, a straight line will be photographed upon the plate. On speaking into the mouthpiece the disc is set in vibration, each movement causing change of angular position of the mirror; the reflected light moves through twice this angle, and the resulting photograph gives us the combination of its motion with that of the carriage. The carriage should run from *right* to *left*. The negative (examined from the *glass* side), and prints taken from it, then give the syllables in their proper order, and show movements of the disc from the speaker by lines going from the observer. The arrangement of my dark room compelled me to make my carriage move from *left* to *right*; hence, in the figures given, forward positions of the disc are represented by the lower portions of the curves.

The general character of the curves obtained is shown in the accompanying figures, which are the actual size of the originals, except that representing the vowel-sounds, which is about one-half (0·56).

The velocity of the carriage for the vowel sounds was 21½; for *Brown University*, 40; and for *How do you do?* 14 inches per second.



In the mathematical discussion of these curves the abscissas are measured by the known velocity of the carriage, and serve to determine the *pitch;* the ordinates represent the amplitude of vibration of the centre of the disc magnified 200 times in the photographs. The reduction of scale makes the magnifying in the woodcuts only 112 times.

The ordinates are not strictly straight lines, but parts of the vertex of a parabola, and closely approximate to circular arcs, whose radius is the focal length of the lens employed. In the figures given, the centres of curvature of these arcs is at the right hand.

With an ordinary tone of voice an amplitude of nearly an inch is obtained, implying a movement of the centre of the disc of ·005 inches as determined by actual measurement.

By varying the accelerating weight and its fall, any manageable velocity may be given to the carriage. Each syllable requires for its articulation about one-fourth of a second, hence the plates must be quite long when the velocity is great. I employ plates two feet in length, and find that velocities from 16 to 40 inches per second give good results. The action of the light is however, inversely as the velocity. To compensate for this, the size of the circular opening admitting the light may be increased. This, of course, causes an enlargement of the luminous image, and apparently involves an injurious widening of the line traced, but, as observed by Dr. Stein in his experiments, the effect of velocity is to narrow the line photographed, since the maximum exposure is in that diameter of the cirlcuar image which lies in the line of motion. This is a great advantage, since a variation of velocity in the vibration is marked by the widening of the line, often more clearly than by the form of the curve.

I have employed the ordinary photographic process, not attempting to obtain special sensitiveness. The brightest sunlight is required, a slight haziness interfering seriously with the result. My heliostat employs two reflectors of ordinary looking-glass, and the loss of light is considerable.

Are *all* the audible elements of speech traceable in these records? In other words, is the record complete? I am not prepared as yet to answer this question definitely, but the following experiment leads me to doubt whether an affirmative answer can be given, while, at the same time, it illustrates in a striking manner the sensitiveness of the ear. The mirror was attached to the disc of a *receiving* telephone, and a photograph taken from it while the instrument was talking audibly. The resulting record was almost a smooth line, showing but very slight indications of movement of the mirror. It would therefore appear that there are distinctly audible elements, which are too minute to be recorded by this method. It is to be noted, however, that the width of the line traced where the vibrations are extremely small is so great as to mask the curvature, so that the experiment just cited is not entirely fair.

The clearness and beauty of the curves obtained can hardly be appreciated without inspection of the originals. Their complexity and variety open a large field for investigation, and they seem to offer the means of analysis of articulate speech.

PRINTING SURFACES AND PICTURES IN PIGMENT.—Lecture 2.

BY THOMAS BOLAS, F.C.S.*

Phototypic, or Raised Printing Blocks, by Swelled Gelatine Process, Zinc Etching, and other Methods.

Here is a fatty ink transfer, similar to that which I put down on a lithographic stone during the first lecture. I now lay it on a smooth and clean zinc plate, and pass through the press. On removing the paper, by soaking, we find that the ink firmly adheres to the zinc, just as it previously did to the stone. A treatment with gum now protects the clear parts of the zinc plate against the adhesion of printing ink, and the application of the ink roller adds more ink to the fatty image already on the surface of zinc plate. So far, our present process resembles the photo-lithographic process described last week; but, instead of printing from the zinc plate, I dust powdered resin over it, in order to give firmness to the fatty image, very slightly warm the plate, and make the resin and ink partially blend, and then put it into dilute nitric acid, containing one part of acid to about forty parts of water, and here it remains for about three minutes, during which time the acid dissolves away those parts of the metal which are not covered by the waterproof coating. Now, let us take the plate out and examine it. We find that the covered parts stand slightly in relief, but only very little, and if we were to continue the etching without further preparation, the acid would gradually undermine the lines, and the image would be lost. Now, the undermining action of the acid can easily be prevented by washing the plate, drying it, and then heating it sufficiently to just melt the resin. Under these circumstances the melted resin blends with the printer's ink, and runs down over the sides of the little ridges left by the etching, and protects these sides from the further action of the acid. Having done this, it is well to gum the plate once more, ink again, dry, and dust with resin before proceeding to another etching. This second etching may be done with stronger acid than the first (say one of nitric acid to thirty of water), and it may be continued longer (say for six or seven minutes), and when this second etching is finished, the whole series of operations must be repeated until sufficient depth is obtained, care being taken that the melting of the resin is only carried far enough to allow it to flow just over the sides of the relief left by the previous etching. In ordinary cases ten etchings are enough to give the necessary depth, but in the case of important work it may be necessary to give twenty or thirty very slight etchings in order to obtain the same depth, without endangering very fine lines or details.

The process of zinc etching has been largely employed for the production of typographic blocks from fatty transfers, either drawn by hand or printed, and this phase of the process bids fair to compete successfully with the art of wood engraving.

There are other methods of producing phototypic blocks, among which may be specially mentioned the method which is founded on the swelling of gelatine. Mr. Dallas was the first to introduce phototypic blocks into the English market, and if you carefully examine some of his specimens you cannot fail to be struck by the fineness and perfection of the details.

By the following modification of the swelled gelatine process I have succeeded in overcoming many of the difficulties of the methods already published.

We start with some clear sheet gelatine about one-thirtieth of an inch in thickness. This can be prepared by drying a layer of gelatine solution on a sheet of waxed glass. To make this gelatine sensitive to light it is soaked in 3½ per cent. solution of potassium bichromate until it becomes flaccid, it is then laid on a piece of clean glass, and the excess of solution is removed by an application of the squeegee. The plate bearing the wet gelatine is then placed in a warm, and photographically dark, place to dry, and when dry it can be easily separated from the glass by raising one corner with a pen-knife. We obtain in this way a flat sheet of sensitive gelatine, having a smooth surface and all ready for exposure under the negative, and this exposure may last from ten to twenty minutes in sunshine, or a correspondingly longer time in the shade.

I now take the exposed film and put it into water to soak, and you will perceive that those parts which were protected from the light begin to swell immediately, while the exposed parts refuse to swell in the water. The soaking should last several hours, but as we cannot spare that time I will take a gelatine which has already soaked the necessary time, and make a cast from that. For this purpose I lay the wet gelatine film on a piece of glass, exposed side upwards, and squeegee it down as before; you see that it adheres to the glass quite easily, and after having made it surface-dry by dabbing with a soft cloth, a little oil is applied and distributed over the surface. Now that the excess of oil has been removed by a soft cloth, I pour on plaster of Paris to a thickness of about an inch, taking care to remove any air-bubbles by the application of a camel's hair brush through the liquid plaster.

Now, this plaster will take about ten minutes to become solid, so let us take another one, which was cast just before the lecture, and which is now set. If we violently tear the plaster and the gelatine apart, the fine details of the cast are almost sure to be damaged. But, instead of doing this, let us hold the glass plate in one hand, and gently push the plaster cast with other. Now you see that the gelatine is slowly sliding over the glass, and finally it will slide quite off, the plaster still being adherent to the gelatine. It is now merely necessary to turn up one corner of the gelatine film, and slowly fold it back so as to draw it off the plaster gently, and without fear of damage, either to the gelatine relief or the plaster, just as a lithographer draws a thin paper proof from the stone. The next step is to make a cast in stearine from the plaster, and for this purpose the plaster should be soaked in rather warm water, about 50° Centigrade, and on this soaked and warm plaster a layer of stearine about an inch thick should be cast. I now dust the stearine cast over with bronze powder, and put the cast into the electrotyping bath, and when a sufficient quantity of copper has been deposited it is merely necessary to back up with type metal, and mount on a wood block, as in the case of this example, our work being then ready for the typographic press. If the process I have described is gone through with an ordinary half-tone negative, an exceedingly beautiful electrotype is obtained, in which the gradations of light and shade are represented by varying degrees of relief. These, or even plaster casts, ought, I think, to have a very good sale, if photographers would only take the matter up. The ease with which they can be made is surprising.

I may mention that, instead of taking a cast from the plaster in stearine, gutta-percha may be used, a press being employed to force the plaster cast—which should be in an iron chase—into the soft gutta-percha. Here is a cast, and here a piece of soft gutta-percha. I now put them into the press, and apply pressure, and in a minute you will see what a good inpression it is possible to get by this means. Of course, electrotyping on the gutta-percha is very easy, but the examples on the table will illustrate the matter sufficiently.

The depth of the relief obtainable by the swelled gelatine process is about equal to that of an ordinary visiting card, and, where large surfaces of white occur, it is necessary to deepen the plate in these parts. This may be done either by cutting out the metal from the finished plate, or, in most cases, more conveniently by raising the surface of the mould, let it be wax, stearine, or gutta-percha, on which the electrotypic copper is to be deposited. This is best done by holding a stick of stearine or wax in the left hand, and a warm pencil of metal in the other hand, and so holding the wax stearine as to let a thin melted stream flow down the warm pencil. This stream is allowed to flow on those parts of the mould which require raising.

Most commercial phototypers content themselves with producing a very slight relief by photography proper, and they then deepen by hand work.

The Photographic News.

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THE NEXT PHOTOGRAPHIC EXHIBITION.

We subjoin the detailed conditions for the guidance of contributors to the next exhibition of the Photographic Society, which will open on Tuesday evening, October 8th, and continue open for little more than a month, in the Gallery of the Society of Painters in Water Colours in Pall Mall East. It will be seen that some modifications are made by which the arrangements will be rendered more acceptable to exhibitors generally. Labels, for instance, prohibited of late years, are to be permitted; but they must only contain the title of the picture and the name of the exhibitor: advertising notices being strictly prohibited. This is really a wise course, and in the interest of exhibitors themselves, as nothing disfigures a picture more than large staring labels attached to the frame. The aim of the Council is to secure neatness and uniformity. The tickets are all to be placed at the left-hand corner, and to be written on a form which will be supplied by the publishers of the Journal of the Society. As it is, in many cases, desirable to afford more details about a picture than can be given on such a label, contributors are invited to send such information to the Secretary for introduction into the catalogue of the pictures; and as many details of great interest can be so communicated, we hope all contributors will send full information, and so make the catalogue a very interesting document.

The Council has come to a decision of considerable importance on another subject. It has been the custom of the Society hitherto to invite contributions from all photographers, whether members of the Society or not, and non-members have received the same privileges of hanging and competition for awards as members of the Society. This has often been felt to be scarcely fair, especially where medals are awarded by the Society, as it was felt that the outsiders had the same chances of medals without contributing to the funds, whereas they were provided by the paying members of the Society. It has been resolved, at the next exhibition, to make a small charge to non-members for wall space, in order that they may bear some share of the costs of the exhibition. This is, we think, clearly equitable, and the small amount—one shilling per superficial foot—cannot deter any from contributing. Foreign photographers, whose contributions the Society is always fond of encouraging, will be treated as honorary members of the Society, and their works hung without charge.

The opening will be celebrated by a *conversazione*, and to meet the convenience of members coming from the country to attend, morning dress will be the rule.

The medals and the aims of the competition will, we think, give general satisfaction. The constitution of the jury of award is the same as last year, and the names will, we think, command general confidence. Two artists, painters of great eminence, Mr. E. J. Poynter, R.A., and Mr. J. Brett, have agreed to act. The President (Mr. Glaisher, F.R.S.), two members of council, Mr. Bedford, and Mr. Robinson (both of whom can well afford, from past honours, to be *hors concours* if they exhibit), and two private members of the Society, Mr. Henry White, whose calotypes used some years ago to be amongst the most artistic pictures in the exhibition, and Mr. F. Piercy, whose artistic taste and skill are well known. This, probably, is the best jury the Society has ever secured, and can scarcely fail to make satisfactory awards. We subjoin the conditions:—

"The Exhibition of the Society for 1878 will be held at the Gallery of the Society of Painters in Water Colours, 5a, Pall Mall East, London, S.W. It will be inaugurated by a *conversazione*, open to members and their friends, at 8 p.m., on Tuesday evening, the 8th of October (morning dress). The Exhibition will remain open daily (Sunday excepted), from Wednesday, the 9th of October, until Tuesday, the 12th of November. Admission (from 10 a.m. till dusk), one shilling. It will also be open every Monday and Saturday evening. Admission (from 7 to 10 p.m.), sixpence. Members will be supplied with tickets to admit their friends.

"All packing cases must be sent (carriage paid), addressed to the 'Photographic Society of Great Britain,' care of Mr. James Bourlet, 17, Nassau Street, Middlesex Hospital, London, W., so as to arrive not later than Saturday, September 28th. Pictures by hand will be received at the Gallery, 5a, Pall Mall East, on Friday, September 27th, and Saturday, September 28th. No packing cases can be received at the Gallery. Each frame shall have the exhibitor's name and subject written on a label, fastened on the left-hand lower corner of the picture; but no address, or anything in the character of an advertisement, will be permitted. Each exhibitor must send a letter of advice (containing a description of each picture, as also a statement of process, and any further detail, to be inserted in the catalogue), addressed to the 'Hon. Secretary,' Photographic Society of Great Britain, 5a, Pall Mall East, London, S.W. The labels to be used may be obtained of Messrs. Harrison and Sons, 45, St. Martin's Lane, London, W.C., at one shilling per dozen, post free. No pictures in Oxford frames, or any previously exhibited in London, will be admitted. Photographs coloured by hand are inadmissible: and not more than one frame of cartes-de-visite or cabinet pictures can be received from one exhibitor. The Hanging Committee will have the power of rejecting any pictures forwarded.

"Bronze medals will be awarded as follows:—Two medals for the pictures, or series of pictures, which, in the opinion of the Judges, shall display the greatest amount of excellence. One medal for the best landscape, or series of landscapes. One medal for the best portrait or series of portraits. One medal for the best single figure study. One medal for the best *genre* picture, or series of pictures. Two medals for the best photo-mechanical prints. One medal for the best transparencies. One medal for the best micro-photographs, or series of micro-photographs. One medal for apparatus. Medals will be placed at the disposal of the Judges for any novelty or other form of excellence, in process or result.

"The medals will be awarded by a jury of seven gentlemen as follows:—Two Artist Painters—E. J. Poynter, R.A., J. Brett; the President of the Society—James Glaisher, F.R.S., &c.; two Members of the Council—Francis Bedford, H. P. Robinson; two Members of the Society—F. Piercy, H. White.

"No award will be made when the works in competition are not, in the opinion of the jury, of sufficient merit.

"The Exhibition will be open to all photographers; but to non-members a charge of one shilling per square foot will be made for wall space; the minimum charge being five shillings.

"Foreign photographers will, for the occasion, be considered honorary members.

"The charge for wall space to those exhibitors who may become members of the Society at the November meeting will be remitted. L. Darwin, *Lieut. R.E.*, *Hon. Sec.*

"*July*, 1878."

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PHOTOGRAPHING ARTICULATED SPEECH.

The possibility of photographing speech is asserted by Professor Blake, of Brown University (U.S.), and in the *American Journal* for July is a picture of "How do you do?" Sounds, or the vibrations, rather, by which they are represented, have already been recorded upon a photographic plate by Dr. Klein, of Frankfort; and M. Konig, of Paris, has shown figures or curves which correspond to the utterances of certain noises. But this is the first time, we believe, that a word or sentence uttered by the human voice has been recorded by the camera. Professor Blake describes his method of going to work very plainly, in a paper on another page; but we may in a brief *resume* explain the whole of his *modus operandi*. He proceeds in a different manner to Dr. Klein. That gentleman, as our readers will remember, in order to record the vibrations of sound, had recourse to the strings of a fiddle. Upon one of the strings was fixed a little square screen, having in the middle a small hole. Through this hole shone a fixed and steady light, which, in the form of a fine point, fell upon a sensitive collodion plate. The collodion plate was a movable one, so contrived that it moved along at a certain regular rate, and if the screen and the string upon which it was fixed were both still, the result would be upon the moving sensitive plate a long line or mark made by the point of light. As soon, however, as the fiddle-bow was drawn across the string, the latter vibrated, and set the screen in a quiver; the consequence was that the light point moved rapidly up and down upon the sensitive plate, and, as this moved forward, a curve line was produced, the curves being sharper and more numerous the quicker were the vibrations. To utter the note *C*, as many as 450 vibrations are necessary in the second (we speak from memory, but we are not far out), while to express the note *D*, a string or wire must vibrate 490 times. Consequently, if our sensitive plate has moved (say) four inches and a-half in a second, there will be in the case of *C* exactly one hundred curves to the inch, while when *D* is sounded, the line or mark upon the plate (supposing it moves at precisely the same rate), will betray nearly one hundred and ten curves, the curves being sharper by reason of their being more closely packed. If the reader will bear in mind this simple plan, he will readily understand Professor Blake's method. He also employs a moving sensitive plate, moving along at an equal and known speed, and he, too, writes down the sounds in the form of curves. Professor Blake goes to the telephone for converting the human voice into vibrations. As everybody knows, the principle of the telephone is to speak against an iron plate, which iron plate vibrates sympathetically; not only does the plate vibrate, but it actually repeats the tones, and thus the vibrations being sent along a wire by the aid of electricity, and conveyed to a second plate at the receiving end of the instrument, we get, on holding the instrument to our ear, a repetition of the same sounds and vibrations which the speaker at the other end has uttered against the sending plate. Professor Blake employs the mouth-piece of the telephone only, and fixes to the vibrating plate a piece of steel wire upon which a mirror is set. This mirror and vibrating plate are, therefore, in perfect communication, and any movement of the mouth-piece is imparted to the mirror. A heliostat sends a bright ray, or pencil of light, upon the mirror; the ray must be direct sunlight, or it is not powerful enough. The mirror reflects this ray again, and it passes into a camera, where it is received upon a movable sensitive plate, as we have said, a tiny bright spot. If the mirror always remained steady, this bright spot would remain always in the same position, and produce upon the moving sensitive plate a perfectly straight line. But the mirror, it has been stated, is attached to the vibrating plate in the mouthpiece of a telephone, and the consequence is, that when anybody begins to speak in the telephone, the iron plate vibrates, and with it the mirror. The result is that the tiny spot of light inside the camera dances up and down upon the moving sensitive film, and impresses upon the latter a series of curves. The reflecting mirror is so arranged that it magnifies the movements of the light spot, and with an ordinary tone of voice Prof. Blake's instrument recorded curves an inch in height. Every syllable required for its articulation about one-fourth of a second, so that in photographing a sentence the latter had to be pronounced deliberately. Under these circumstances the sensitive film had to be moved along very quickly, a speed of from sixteen to forty inches per second being found to give the most satisfactory results. At the same time it is but fair to state that Prof. Blake only employed the ordinary wet collodion process in his experiments, and did not attempt to make use of a specially rapid process. For this reason he found sunlight to be absolutely necessary, a slight haziness in the light at once interfering with the picture. Professor Blake has not only published cuts of his results so far as simple sounds are concerned, but has shown a long series of curves which correspond to the sentence "How do you do?" Another slip of which he has published a wood-cut is "Brown University." In this the markings obtained by sounds in which the English l predominates, are certainly to be distinguished from others. Professor Blake does not claim that he can photograph any sounds in this way, or rather produce distinctive pictures of every sound, for there are vibrations, he fears, too delicate to be reproduced in this way. But the curves are so marked and different, and are at the same time so varied, that a study of them would no doubt teach us something more than we know at present of articulate speech.

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TOTAL ECLIPSE OF THE SUN.

On Monday last there was a total eclipse of the sun, visible only, as such, along a track extending from Eastern Siberia across Behring's Straits, athwart Alaska, British Columbia, and the Western States of America.

The leading astronomers in the United States, and some from this country, visited the favourable spots for observation, and telegraphic despatches in our daily contemporaries record their success. The following appeared in the *Times* of Wednesday:—

(By Anglo-American Cables).

"Philadelphia, July 30.

"The eclipse of the sun was successfully observed at all points of total obscuration in the United States. Many photographs of the corona were taken."

"Lajunta, Colorado, July 29.

"The eclipse was successfully observed here. The weather was perfect at all contacts. Several photographs were taken. The corona was radially polarized. Vulcan was not observed. The prominences were insignificant."

An interesting article in the *Times* gives details of the progress and results of photographic and other observations, from which we make the following extracts:—

"Although it must be admitted that there is not on this occasion any reason for expecting such decisive conquests in the domain of the unknown as were achieved in 1868-1871, yet many important questions remain to be answered which only can be answered, it would seem, during total eclipse of the sun. If we consider what those conquests were, we shall better understand what yet remains to be done. Until the year 1868 astronomers were in doubt what might be the nature of those ruddy prominences (as they were called) which are seen around the sun during total eclipse. The photographs obtained during the total eclipse of 1860 by De la Rue and Secchi had proved unmistakably that the prominences belong to the sun; for the successive photographs of each series showed the moon in different positions as she gradually advanced athwart the prominences; while De la Rue's series differed from Secchi's precisely as they should differ on account of the difference of stations, if the prominences belong to the sun. Many physical considerations showed that the prominences cannot possible be mountains 80,000 or 90,000 miles high upon the glowing surface of the sun. Other considerations showed, though not so decisively, that these amazing objects cannot be clouds—that is, that they cannot be formed of multitudes of minute liquid drops floating in the sun's atmosphere, as the minute vesicles forming our clouds float in the earth's. And, again, the fact that the red prominences had readily formed a photographic picture should have made it tolerably clear that their redness is not like the redness of heated iron. If, like red-hot iron, the prominences shone with red, orange, and yellow rays—or, as it is technically expressed, if they shone only with light from the red end of the spectrum—they would not form a photographic image, except when such special contrivances were used as Becquerel, and recently our Captain Abney, have employed to obtain pictures of the red part of the spectrum. Since with ordinary photographic methods they readily formed pictures, it should have been clear that their redness is due to the presence of certain tints only of red or orange, and that the prominences possess, also, certain tints belonging to the blue, indigo, and violet parts of the spectrum; for these tints alone have the power of affecting the ordinary photographic prepared plates. These considerations involved, in reality, the interpretation of the mystery of the so-called prominences. Self-luminous objects, which shine with special tints belonging to different parts of the spectrum, must be gaseous, and therefore it might safely have been asserted, after De la Rue's success in photographing the prominences during the total eclipse of 1860, that these objects are masses of glowing gas. It was not, however, in this way that the discovery was actually effected. Possibly these considerations may have been urged, though we do not know that they were; but certainly the important conclusion to which they lead was not reached. So that when the great eclipse of August 1868 was expected, astronomers determined to ascertain the nature of the prominences by the direct spectroscopic examination of their ruddy light. At each station where spectroscopists observed that eclipse, the question was decided at the moment when the last rays of direct solar light disappeared. The light of the prominences then alone passed through the prisms; and in an instant it was seen at each station that this light consists of three principal tints—red, orange, and blue-green—while five or six other tints could be discerned, but less plainly, insomuch that several of the observers noted only the three chief colours. It was thus proved that the prominences are formed of glowing gas, though what gas or gases are present was not at once determined. Most of the observers concluded (rightly) that the red and green lines were two of the well-known lines forming the spectrum of glowing hydrogen; all the observers concluded (wrongly) that the orange line was the well-known double line of the almost ubiquitous element sodium.

“ Almost immediately followed the more important discovery—that the prominences can be examined when the sun is not eclipsed. Janssen during his observation of the prominence lines felt assured that he could see them without the aid of an eclipse. The method he employed was one which Huggins had pointed out several months earlier (see the Notices of the Astronomical Society for February 1868), though Janssen and Lockyer were the first to apply it successfully. The principle of the method may be readily explained. When a luminous body shines with all the colours of the rainbow, as the sun does (neglecting the solar dark lines or missing tints), the spectroscope, by sending rays of different colour in different directions, resolves the white image of a line of sunlight into a rainbow-tinted streak. The more the dispersive power of the spectroscope is increased the longer this streak becomes and the fainter the lustre of its various parts. But in the case of light like that of the prominences, which consists of certain tints only, a different result happens. The spectroscope resolves the pinkish-red image of a line of prominence light into three bright lines—one red, one orange, the other green—besides other fainter ones. The more the dispersive power of the spectroscope is increased, the farther apart these lines are thrown, but they are not rendered fainter. Thus, when the light of a prominence and that of the sunlit sky, which usually veils all the prominences from our view, are dealt with together by the spectroscope, the light of the sky may be reduced, or, as it were, diluted by dispersion, while that of any particular prominence tint remains unchanged. When the dispersion is sufficient the prominence-line is no longer veiled from view. With still greater dispersion, indeed, not a mere line of prominence light may be dealt with, but the entire prominence, each coloured image—the red, the orange, and the green being brought clearly into view on the rainbow-tinted back round of the diluted spectrum, though these three images and the other five or six fainter ones are powerless, when combined into one, to show directly through the veil of sunlit air.

At this point the study of the prominences during total solar eclipses was practically brought to a close; for, from this time forth, it was possible to examine the edge of the sun for prominences when he is not eclipsed, to measure their extent, to note the changes which take place in them, and to analyse their substance.

“ It is, we fear, scarcely to be hoped that on this occasion anything new will be learnt about that amazingly complex atmosphere which underlies the sierra, extending, perhaps, to a height of about 400 miles from the surface of the sun. The existence of this atmosphere was first directly demonstrated by Professor Young, of Dartmouth College, Hanover, New Holland, during the eclipse of December 1870, though indirectly its presence around the sun had been indicated earlier. In fact, Mr. Proctor described beforehand what would be seen when the experiment successfully made by Professor Young should be tried. It is known to all who have studied recent solar researches that the light of the sun when analysed by the spectroscope shows all the colours of the rainbow, but not all the tints. There are thousands, nay, tens of thousands, of tints missing from the rainbow-coloured streak called the solar spectrum, the absence of each being indicated by a dark line crossing that streak at right angles to its length. It is equally well known that the rays corresponding to these missing tints have been abstracted from the solar light by the absorptive action of the various vapours which surround the glowing mass of the sun, and from the position of the corresponding dark lines in the spectrum the nature of many of these vapours has been ascertained. Kirchhoff, who thus interpreted the dark lines in the solar spectrum, supposed that the absorptive vapours form the corona, or glory of light, seen around the sun during total eclipse, or that, at least, they occupy a large part of the coronal region. But, as Mr. Proctor showed early in 1870, the evidence points to the conclusion that they form a relatively shallow envelope around the sun. It occurred to Young that advantage might be taken of the fact that when the moon in total eclipse just conceals the sun's disc—that is, at the moment when totality begins or ends—any shallow envelope surrounding the sun would be shining alone, or only in company with the relatively faint lustre of the prominences and corona. The vapours which form the sun's atmosphere would no longer indicate their presence by absorbing the brighter light of the sun, but would shine alone. So that when their light was examined with the spectroscope, instead of the rainbow-tinted streak crossed by multitudinous dark lines, we should have a spectrum consisting of multitudinous bright lines It would still be a rainbow-tinted spectrum, because the bright lines would be rainbow coloured—that is, those at one end would be red, those at the other violet, and the intermediate lines orange, yellow, green, blue, and indigo in order. The difference between the two spectra may be thus illustrated. Suppose that athwart a strip of dark paper millions of fine coloured threads were laid so as to form a rainbow-tinted streak, and that all these threads, except some 20,000 or 30,000—not adjacent threads, but scattered irregularly along the strip—were gummed down to the dark paper, which was entirely concealed by the series of threads. Suppose a similar strip of dark paper, having a slightly adhesive surface, to be superposed on the rainbow-tinted array of threads, and gently pressed down, so that when lifted again all the ungummed threads adhered to it. Then the first strip, thus robbed of 20,000 or 30,000 tints, would fairly picture the solar spectrum; while the second strip, showing these 20,000 or 30 000 threads, would fairly picture the spectrum of the solar atmosphere. One would be a rainbow-tinted streak crossed at right angles by numbers of dark lines; the other would be a dark strip crossed by a rainbow-tinted array of bright lines at right angles to its length.

“ The result of Young's experiment agreed with these anticipations. Doubts were entertained by some, and the experiment was repeated in December 1871, and again in April 1874, always with the same result. No very great interest attaches to the observations thus made, because, in point of fact, they demonstrated nothing which might not have been foreseen by all who chose to examine the evidence already available. Again, the display of the rainbow-tinted array of bright lines last so short a time that no special lines can be identified among the myriads which flash into view for two or three seconds, and then disappear. But discoveries which have been made since 1870 show that if any permanent record could be obtained of the spectrum thus seen for a few seconds, most important light would be thrown on some very difficult questions in solar physics. It has been supposed by Dr. H. Draper, of New York, that we can identify the bright lines of oxygen in photographs of the violet part of the solar spectrum. In other words, oxygen seems to show its presence, not by absorbing rays of those tints which it emits, but by emitting more light of those tints than it absorbs. It may be that (assuming Dr. Draper's photographic researches to be trustworthy) the oxygen whose presence in the sun is thus indicated lies below the surface of the sun. In this case we could obtain no evidence on the subject during total eclipse. But it is also possible (though, for our own part, we think it most unlikely) that the oxygen extends above the visible surface of the sun, so that its bright lines would be seen in the rainbow-tinted array of coloured lines described above. Eye-observation could not determine whether the bright lines of oxygen are present or not among thousands of lines seen only for a few seconds; but if a photograph of that part of the spectrum could be obtained during those few seconds, the question would be satisfactorily settled. This, however, would be a photographic feat of great delicacy and difficulty, and scarcely to be achieved, we think, at present.

"With regard to the corona, we may be more hopeful. This appendage of the sun was successfully photographed by Brothers, of Manchester, during a few seconds only of the totality in December 1870, the sky being only clear for a short time. It was well photographed six times at Baicull in December 1871, by Mr. Davis, and as often by Colonel Tennant at Ootacamund. If on this latter occasion the photographers had availed themselves of the whole duration of totality, no doubt much more effective and valuable photographs would have been obtained. But unfortunately it had been suggested that the corona may change in appearance during totality; and though it was demonstrated that this cannot be the case, many attached importance to the suggestion. It was therefore supposed that a series of several views would have special value as disposing of this question. Thus an important opportunity for obtaining good photographs of the corona was in great part thrown away.

On the present occasion no doubts are any longer entertained on this point, and probably the whole duration of totality will be devoted to obtaining good photographs of the corona. The Americans may be expected to achieve important successes in this department of research, as they are very skilful in photography, and most ingenious in applying the art to astronomical researches. But we are glad to note that one of our English observers—Mr. A. Cowper Ranyard—has taken to Denver City a speculum 13 in. in daimeter, with which he hopes to photograph the corona effectively.

"We should be glad to hear that advantage had been taken of the clearness of the atmosphere in the Western States, and of the elevation of several suitable stations above the sea-level, to trace the streamers of the corona as far as possible from the sun's globe. Exceedingly interesting and curious information respecting the sun's surroundings may yet be obtained from direct telescopic or even from naked-eye study of the corona, now that the attention of observers is no longer distracted by doubts as to the real nature of this vast solar appendage.

"Whether any light will be thrown on the physical constitution of the corona may well be doubted. It was shown by the American observers in 1869 that a portion of the light of the corona comes from glowing gaseous matter—a result since abundantly confirmed. It seems to have been fairly shown also that the corona partly shines by reflecting sunlight, though when we remember how much of the atmosphere above the observer's horizon-plane is illuminated by direct sunlight during totality, considerable doubt must necessarily hang over any evidence based merely on the reception of faint solar light from any part of the sky. It is true the part of the sky occupied by the corona during totality is not directly illuminated by the sun, but it receives solar light reflected from our earth and from the air. Still, on the whole, Janssen's recognition of the solar dark lines in the spectrum of the corona may be taken as very strong evidence in favour of the theory that the corona consists in part of matter which is capable of reflecting sunlight. We may possibly receive more decisive evidence on this point during the present eclipse, the circumstances of which are favourable for an observation of the kind."

A TEST FOR HYPO IN SILVER PRINTS.

Herr Schrank publishes in the *Photographisches Wochenblatt* the following test to be employed for the purpose of ascertaining whether all hyposulphite has been removed from a batch of washed prints. You select one print at random, which is considered fit to dry and mount, and cut it into pieces. A vessel of pure distilled water is obtained, the pieces put into it, and the water brought to boiling point. After boiling some time, the water is filtered off carefully, and in it is then boiled a little potato and starch.

In the meantime some iodine has been rubbed down in a porcelain dish with distilled water, the fluid being of the colour of madeira. A drop of this iodine water added to the starch water just mentioned should instantly produce the blue tint of iodide of starch—in the event, that is, of the absence of any hyposulphite of soda in the starch water. Generally, it is necessary to add several drops of iodine water, until the reaction is remarked, for even the surface of half a carte-de-visite holds quite enough of the dangerous salt to neutralise the blue action of the iodine.

If the blue colour does not instantaneously appear, this is proof that there is hyposulphite of soda still in the prints under examination, and in that case they must obviously undergo a further washing. The rolling of the prints between wood rollers removes the fixing medium very completely, and one of these days, perhaps, we may secure an agent which will counteract or decompose the hypo without injury to the impressions. In the meantime the best protection we have is a thorough washing and an effective toning of the silver prints.

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CHROMO-PHOTOGRAPHY.

A New Albertype Process that Reproduces Colour in Pictures.

[We quote the subjoined article from the *New York World*, as giving a clearer idea of the process recently worked out in Munich than most of the accounts, and as also showing how far our American brethren had worked the idea out.]

The great improvements in making cheap and faithful copies of valuable works of art by photo-lithography now bid fair to be far exceeded by processes discovered by Mr. Albert, court photographer, of Munich, Germany, but so far improved upon by Mr. Edward Bierstadt, of this city, that the latter artist feels confident that he will soon be able to produce copies of landscapes, portraits, and oil paintings in general, which shall be not only exact counterparts of the originals in tone, colour, and effects, but which can be sold at prices even lower than those asked for ordinary photo-lithographs. The first specimens of this chromo-photography, exhibited in this city, are from Mr. Albert's laboratory, and are faithful copies of certain tapestries much valued by the King of Bavaria. One is an elaborate pattern of ferns, palms, and creeping vines, the background of which is a delicate summer sky. The others are representations of the vagaries in colour and pattern of a designer of tapestries. Each picture was made from three negatives of the pattern copied, produced by some modifications of the Albertype process.

Albertypy is a method of reproducing photographic impressions by the medium of printer's ink. Many specimens which were exhibited at the Centennial Exposition of 1876 were placed far in advance of the ordinary photographic effects, and were thought to be more faithful copies of the originals than could be produced by the tools of the most skilled engraver. A perfect representation of the object wanted for a picture is the aim of the artist and engraver; and photography, as developed prior to Albert's discovery, was the only faithful copyist. Its limitation in value was the perishableness of the materials employed, and the lack of colour. Albert's pictures are, as far as appearance goes, photographs; but they are reproduced upon an ordinary lithographic printing-press and with printing-ink, one of the most indestructible agents known. Cardboard, paper, cloth, or silk may be the material which receives the impression, and the process thus widens the range of its usefulness to views of machinery or merchandise, as well as map drawing and copies of works of art.

The Albert process consists in coating a piece of plate-glass with gelatine made sensitive by treatment with bichromate of potash, and dried in the dark. A photographic negative made in the usual manner is glued on the side of the glass plate opposite to the gelatinised surface, and the plate is exposed to a strong diffused light, with the negative towards it. The effect of this is to harden the gelatine in proportion to the light that has penetrated the negative. When the impression so made upon the gelatine has been sufficiently developed, the plate is immersed in cold water to wash out the remaining bichromate of potash, after which it is ready for the press.

It is in the printing that the peculiar merit of the process is shown. Gelatine is soluble in water only when heated above ninety degrees; still, its surface absorbs a little water when it is newly set, even at about fifty degrees. Those parts, however, which have been subjected to most light—namely, the tracings of the picture—are hardened by the light beyond the power to absorb water unless at high temperature; consequently, when the surface is sponged, those parts previously subjected to much light absorb water enough to repel printers' ink, while the other portions accept it more or less shaded in proportion as they have been subjected to a more or less intense light. When the paper or Bristol-board backing for the picture is passed through the lithographic press in which the negative is fixed, a clearly-shaded, faithful reproduction of the original picture is left upon it, which may be reproduced many hundred times by simply re-wetting and re-inking the gelatine after each impression.

Messrs. Harroun and Bierstadt have many hundreds of pictures copied by this process, which experts consider superior in clearness and grading of light and shade to any lithographs or photographs. Hundreds of persons have had their pictures reproduced as frequently as desired, while popular paintings and copies of the old masters, albeit in printers' ink, are put within the reach of very limited purses. Not only this, book illustrations of the finer kind, stereoscopic views, and even illuminated business cards are made as cheap or cheaper than by any other process; and specimens of fossils or any illustrations of natural science are reproduced with the exactness of nature itself.

Ever since this marvellously simple process was brought to practical success, both Mr. Albert and Mr. Bierstadt have been experimenting with a view of grafting upon it some improvement which should place chromo-photography as far above other printing in colours as chromo-lithography is in advance of older methods of picture copying. They looked for the solution of the problem to the accepted fact in photographic science that all colours are combinations of three primary colours, namely, red, yellow, and blue. If by any means the sunlight could be so exhibited that only one of these colours at a time should be allowed to act on the sensitive plate, they had penetrated the secret. The experiments made by them exploded several accepted scientific theories. First, Professor Tyndall's assertion that the light of the sun's rays alone affected the sensitized surfaces and produced the picture, was demolished. This was proven by using red, yellow, or blue glass for the screen. Mr. Bierstadt then experimented with various solutions of metals and minerals, and tried several hundreds of these solutions before he found any that produced the desired effects. As these results are not patentable, he is unwilling now to say in which of the colour experiments he found success; neither does he know the results of Mr. Albert's experiments. The principle, however, is the same. A coloured landscape or portrait is thrown into the camera through a screen, by which all that is yellow and all that is red is excluded. There is thus produced a negative after the Albertype kind of everything blue in the picture. A screen which absorbs all the colours excepting yellow is the next medium, and the second negative represents the yellow portions of the picture. A screen for red rays completes the third negative. The printing is done just as in the ordinary Albertype, only red, yellow, or blue inks are used, and each picture is printed three times—once upon each negative.

The process is still far removed from working easily. It has been found beyond the science of experimenters to produce the vivid hues of some of the natural colours. As it stands now, Mr. Bierstadt hopes to be able to copy portraits and other pictures with neutral or subdued tints with entire faithfulness. It cannot yet be adapted to the picturing of natural scenery, because the production of the negatives is much slower than ordinary photographing, and any movement of the object will impair the picture. The same difficulty is met with in taking pictures of living objects. The chief value of the process, as far as it has been matured, is in picturing tapestries, maps, or merchandise, or neutral-tinted oil pictures; in fact, its chief merit consists in reducing the amount of skill and manual labour, as well as the material and number of processes, so as to bring the cost below that of photo-lithography, while improving the copies in fidelity and brilliancy.

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SALTS OF IRON FOR HARDENING OR STEELING COPPER PLATES.

BY PROF. BOSTTGER.*

In the employment of copper plates for printing, whether in a photo-mechanical or other analogous process, it is very necessary that the surface thereof should be hard and steel-like. Plates may be hardened by depositing a surface of iron by the electrotype process, but the method is a tedious and long one. Again, in the decomposition method of mine, it is possible, when the plates have been worn by printing, to remove the film by muriatic acid, and again coat the plate evenly in a few minutes.

The double sulphate of iron and ammonia is what I used to employ in my steeling of copper plates, and this is a method still adopted by many; it is only lately, indeed, that I have observed that an iron solution prepared in the manner following is better adapted for the purpose:—You dissolve, in the first place, ten grammes of so-called yellow prussiate of potash and twenty grammes of tartrate of soda or potash in two hundred cubic centimetres of distilled water, and add to the solution three grammes of sulphate of iron dissolved in fifty cubic centimetres of water. In this way there is precipitated a good deal of Prussian blue. If now there is added, drop by drop, to the above, a solution of caustic soda, taking care meanwhile to stir vigorously with a glass rod, until the blue precipitate has disappeared again, then you obtain a perfectly clear and slightly yellowish fluid, which can be employed at once for steeling copper plates.

This fluid can also be employed, without the medium of a mordant, to dye woollen articles of a beautiful blue.

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Correspondence.

EARLY USE OF PHOTO-LITHOGRAPHY FOR PRODUCING GOVERNMENT MAPS.

Dear Sir,—It is some years since I have taken an active part in practical photographic work; but I have not on that account lost interest in the art, or forgotten the past, or wavered in loyalty to the News and its Editor.

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* *Photographische Notizblatt.*

It was therefore with some surprise, acidulated with a trace of annoyance, that I found in your issue of June 28, of this year, p. 301, the writer of "Photography In and Out of the Studio" making the announcement that the Austrians were using photo-lithography for the production of Government maps from original drawings. The writer explains how this is done, and its advantages, as if the method were something new, and expresses astonishment that it has not been resorted to before in map-making establishments.

This is really too bad; but I refrain from discussing it sarcastically, and will simply say, for the information of the writer of the article in question, and young photographers in general, that in 1859 my photo-lithographic process was introduced into the Land Office, Melbourne, Victoria, expressly for the reproduction of drawn maps. In that year circulars were sent to all the surveyors and draughtsmen in the colony (numbering about seventy), instructing them in a uniform method of drawing for that purpose. Maps excellent in quality were at once published and sold, and have been without intermission ever since. I am afraid to say how many thousands have been produced in this way; but before I left Melbourne in 1862 an edition had been printed from each of about 1,800 different maps; and since that time the applications of the process in this direction have greatly increased, both in number and importance. Transfers were also made to copper, as well as to stone and zinc. I mention this because it is stated in the article in question that the transfers are made to copper. What is done with them after they are got upon that metal is not clearly explained; but the inference is, that they are printed lithographically, at least in a manner similar to that followed by Mr. Baden Pritchard at Woolwich. I venture to doubt this, and to suggest that the elucidation of this one point would have a real interest for those familiar with photo-mechanical printing. In my case the transfers to copper were made as a guide for the engraver; they took the place of lamp-black tracings by hand, which were rubbed down with a burnisher on the metallic surface, made adhesive by a very thin coating of wax.

In 1862-3, the Prussian War Office did me the honour to appropriate my process (without acknowledgment) from printed and written descriptions and specimens which I sent the Bureau; and, through the instrumentality of outside employées, used it largely then and subsequently for the production of original maps.

Most of the other nations of Europe, and, I believe, all the British colonies, have used photo-lithography extensively in the same way, and to all these facts the columns of the News will be found to bear testimony.

In this country it is also employed by the Land Office, the U.S. Engineers, the Hydrographical Bureau, and to some extent by the Coast Survey Office; also by the Congressional Printer for numbers of maps attached to public documents. In the United States, especially, as well as in every other civilized country, private publishers also depend much upon this process for topographical work, so that the saving which it has effected for the several governments, and the gain to mankind generally, is incalculably great.

As the pioneer in practical photo-lithography, I may be excused for drawing attention to these facts.

The Southampton Process in my opinion never furnished work of the quality desirable for first-class maps; but that is not the sole reason of its non-use in the publications of the Ordnance Survey of Great Britain. The only map printed lithographically in the Southampton Office is the Parish map. This is on a large scale, and on very large sheets. It is coarsely executed on transfer paper by hand, and with the aid of stamps; after which it it transferred to zinc, and printed in the ordinary way. If I recollect rightly, no MS. original of this map is ever made, at least none fit for reproduction, and to have prepared such of good quality, and of size permitting of reduction (which in early times was thought to be almost necessary), would have been costly, and perhaps very inconvenient. The other ordnance maps were all engraved on copper, in the very best manner, to ǝʇ·ı which by photo-lithography would be impossible.

It will be seen, therefore, in view of the accurate and elaborate nature of the survey, furnishing an infinite amount detail, of the determination of the several scales by law, the existence of certain methods and styles of production which had been in vogue for years, and the organization of an office for carrying out a well-considered system, that the introduction of photo-lithography, when its feasibility was first demonstrated, might not have been so easy a matter. At all events, we cannot readily decide, not knowing all the circumstances, what the British authorities could or could not have done eighteen or nineteen years ago, or what they should have done since. And generally it will be clear to most people that the question of the publication of maps by the different governments for a variety of purposes is a big thing and the solution of it cannot be evolved out of one's inner consciousness, but requires a study of each particular case.

Very truly yours, J. W. Osborne.

212, *Delaware Avenue, Washington.*

[Many of our early readers, who will be glad to see Mr. Osborne's name once more in our columns, no doubt remember his early application of photo-lithography to the production of very fine maps.—Ed.]

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Proceedings of Societies.

Liverpool Amateur Photographic Association.

The July out-door meeting of this Association took place on the afternoon of the 25th ult. Permission had been kindly granted by Miss Watt to the members to photograph in her grounds of Speke Hall Had it not been for the unavoidably short notice of the meeting, no doubt a larger number of members would have attended. As it was, about sixteen met at the rendezvous; but a downpour of rain, and a leaden sky which gave but little promise of breaking up, so disheartened one or two that they declined going. Mr. Councillor Forrest, who was unable to go, observing the disappointed looks, generously offered a prize for the best negative taken that day.

The party started at 1.30 p.m., in a waggonette, and had gone but a short distance when the rain came down so heavily that one or two more desertions took place as a passing omnibus or friendly shelter offered. A consultation was held as to whether the excursion should be abandoned, as, from the appearance of the sky, no signs of the rain ceasing could be observed. One of the members would not hear of turning back, expressing his wish to proceed if only to have the pleasure of competing for Mr. Forrest's prize. Owing to his enthusiasm the others rallied round his *banner*, and the waggonette proceeded onwards. Jokes were passed freely in order to revive their drooping spirits, which the Secretary did his best to depress by stating that he was afraid they would not be allowed to photograph, as he had only asked permission to go to the Hall on "a suitable day," and it was announced that, though all had intended to use *dry* plates, every one would be obliged to work *wet*, and that india-rubber coatings were only allowed on the *h*edges. The proverb, "None but the brave deserve the fair," was verified, as before the cameras could be unpacked it became fair; and though there was no sun, the light was such that several views were taken where, in sunshine, the exposure would have been difficult. Speke Hall is a very fine specimen of the black-and-white timbered Lancashire manor house of the time of Elizabeth, bearing over the porch the date 1598. The light was not strong enough to take any views of the interior courtyard, in which are two flourishing yew trees; but about thirty-two plates were exposed on the exterior.

The party afterwards drove to the Old Hut, another specimen of the timbered black-and-white, now a farm house, but formerly the gatehouse of the ancestors of the Ireland family of Hale. Here a few plates were exposed, and the members then went on to the residence of Mr. E. Twigge, of Halewood, who had kindly invited them to join him in what proved to be a most enjoyable and substantial tea, which, no doubt, counteracted any ill effects of the previous damping.

No formal business was transacted afterwards beyond reading the minutes of the last meeting, which were confirmed, and, after spending some time in the garden, and viewing some of Mr.

Twigge's photographic treasures, the members started homewards, having, notwithstanding the miserable weather at the outset, heartily enjoyed a very pleasant afternoon.

The resulting negatives are understood to have been very successful.

It is expected that arrangements wlil be made for another outdoor meeting about the end of August.

Talk in the Studio.

Enamelling.—Mr. Lord, of Huddersfield, sends us an example of the enamelling he does for the trade. It is very excellent indeed.

How a Horse Trots.—The *Scientific American* thus summarises the operations in photographing the horse in motion of which we gave a full report in our last:—"By means of a series of cameras standing one foot apart and operated by electricity, a California photographer, Mr. E. J. Muybridge, has succeeded in taking negatives of every phase of a trotting horse's action while making a complete stride. In this way it becomes possible to study the successive positions of a horse's body, legs, and feet while he is going at full speed. The horse photographed was Mr. Leland Stanford's trotter Occident, while travelling at a 2:24 gait, with a stride of 18 feet 6 inches. The San Francisco *Bulletin* reports that the photographs show the fast trotter's feet to be all off the ground together twice during the making of the stride, contrary to the assertions of the authorities hitherto accepted."

Photographs on Silk.—Messrs. Allard and Guyot, silk manufacturers of Lyons, are introducing a new industry—the production of photographic impressions on stuffs. They sent to a recent meeting of the Photographic Society several pieces of silk, with a variety of photographic pictures printed on them—among others, some large medallions representing pictures of the old masters. These specimens are no less than forty meters in length. The process by which they are produced is not given, but there is reason for believing that the prints are made with salts of silver. But, however that may be, this application of photography, which ever since the discovery of the art has been sought after, and made the object of numerous more or less successful experiments, appears now to have been successfully realized in the hands of Messrs. Allard and Guyot.—*Scientific American.*

Use of Methyl Chloride for the Production of Low Temperatures.—At a recent meeting of the French Physical Society, M. Vincent called attention to the use of chloride of methyl for production of low temperatures. It may be extracted in large quantities and cheaply from the products of beet-root molasses. It is normally gaseous, and liquefies under about four atmospheres pressure, when it may be conveniently carried about in iron or copper vessels, a store of cold at easy disposal. On opening a cock, the liquid will flow out and give a bath at—23°, its boiling temperature under atmospheric pressure. If the vaporization be intensified by a current of air, the temperature descends to about—55°. M. Vincent has arranged an apparatus for utilization of such cold. He encloses two or three kilogrammes of liquid chloride of methyl in a double wall enveloping a bath of alcohol or chloride of calcium in solution, and protected exteriorly by an isolating layer of cork raspings. To obtain low temperatures, a cock is opened to allow communication of the double envelope (through a caoutchouc tube) with an air-pump.

Converging Perpendiculars.—*The Photographic Journal* says:—"We recommend the following elementary experiment to those of our readers who are in doubt as to the effect of tilting the camera without using the swing-back when taking an architectural subject:—Take out the front board of the camera and substitute a thin piece of blackened cardboard for it. In the centre of this substituted front pierce a small hole by a darning needle. Now place the camera in front of a well-lighted architectural subject, and view it on the lowering screen. Tilt the camera, and it will be found that the perpendiculars will converge; bring the swing-back vertical, and the perpendiculars will be parallel lines. Level the camera, cover up the hole made, and pierce another higher up in the cardboard front, and it will be found that, if the hole be pierced at the right height, the same amount of view is included as when the camera is tilted, and that if the swing-back be vertical, the perpendiculars are still parallel. Now a lens is simply a substitute for the pinhole, and is an optical artifice for increasing the illumination of the view. Both the pinhole and the lens will give correctly the projection of the view on any plane on which it is thrown, whatever its inclination, for perspective is merely a matter of angles, and not of absolute heights. The optical centre of a lens occupies the position of the pinhole in the foregoing experiment; and, broadly, it may be stated that a knowledge of the position of the axis is only useful to know for focussing purposes. One quality of a theoretically perfect lens is, that when it is rotated in any direciton round its optical centre every emergent ray should continue its path in the same direction that it had where incident. There is no lens of any use which answers absolutely to this condition, but the existence of the pantascopic camera is a proof that, for small angular rotation round the optical centre, it is nearly fulfilled."

To Correspondents.

Henry Somerville.—It would be an improvement to place the ridge out of the middle, so as to give more light; but it is not absolutely necessary, as much can be done with reflecting screens, which are best made of white calico, or covered with white paper or tin-foil.

A Man in a Hurry.—A negative for enlargement is better without varnish or preservative coating of any kind. Thanks for formula. From whence or whom is it derived?

P. G. W.—From your description we think something more than the hot weather is responsible for the condition of your bath. It has evidently been brought into contact with some contamination which has reduced the silver salt. We see no reason to suppose that it will recover itself. The best plan will be to reduce it, or place it amongst the other waste to be reduced.

R. M. S.—The term crystal varnish used to be applied to a varnish made by dissolving gum-dammar in benzole. It was used chiefly for collodion positives. It is somewhat soft, and not suited for protecting negatives. Amber varnish consists of amber dissolved in chloroform. It is a hard good varnish. Mr. Thomas makes such a varnish, we believe. For general use in varnishing negatives a spirit varnish answers best. Nothing, perhaps, is harder or better than shellac, but it is dark in colour unless subjected to special treatment. White lac is not well suited for making negative varnish, as it has lost its original hardness in the process of bleaching. Furthermore, some samples are bleached with chlorine, of which they retain traces, and this, coming into contact with the silver on sensitive paper, forms chloride of silver, which, blackening in the light, injures the negative, causing it to print very slowly.

Young Hand.—By all means try simply iodized collodion. The experience will be valuable to you. When you have satisfied yourself of the difficulty of working without spot and comets with such a collodion, try the addition of half a grain per ounce of bromide, and note the magical disappearance of the trouble. In mixing collodion we generally add the sensitising salts at the same time, dissolving them in the alcohol. In this alcohol we then place the pyroxyline, and when it has well soaked add the ether. By this method we always secure ready solubility.

G. D. O.—We have never worked with an iron developer stronger than fifty grains to the ounce; but we see no reason why you should not try a greater strength.

Perplexed.—Blotting off the sensitive paper as soon as it leaves the silver bath, so as to remove all free nitrate, will materially diminish the vigour of your prints. It is a good plan to adopt when using hard negatives which give over-vigorous prints, but it is not good with good negatives, and especially with weak or soft ones, as the free nitrate adds to the vigour and brilliancy of the print. It is important to print to the proper depth for each especial subject; but, as a rule, we prefer a trifle too deep printing to insufficient printing.

Non-Member.—The rumour you have heard is correct, and the plan, you will probably admit, is only fair. See conditions and remarks on another page.

W. W.—The glove had been overlooked. It is now sent.

R. L. M.—It is a difficult thing to deal with a negative in a printing-frame left out in the rain, so that the print has stuck to the negative. If you tear away the paper roughly, you will tear up the film. Try damping the back of the paper, and then gently rub it with the finger, so as to *peel* it away in thin layers. Skill, care, and ingenuity may possibly save the negative, but it will be a difficult task.

H. and Co.—The symbol Ag_2O means suboxide of silver. The strength of a permanganate solution for intensifying is not important: any strength from 10 grains to 20 grains per ounce will answer.

Several Correspondents in our next.

The Photographic News, August 9, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Book on Emulsions—The Observations of the Total Eclipse—Why Some Carbon Prints turn Yellow.

A Book on Emulsions.—We are glad to see the announcement of a work upon *Emulsion Processes*, and more glad still to remark that the author is Captain Abney. So many emulsion processes have been proposed of late years that some of us are getting out of our depth in regard to them. A work, therefore, that treats specially on the subject, and collates what has been brought before the photographic world during the past five years, will be favourably received, for there can be little doubt that emulsions will play an important role in the future of photography. Nearly every rapid process proposed of late has been an emulsion process, and it would not surprise us to learn that the Boissonas method, as also the exceedingly rapid dry plates of Mr. Swan, have something in common with emulsions. Now that they are before the public, it seems strange that recourse was not had sooner to emulsion processes. Our own first experiments with the bromide emulsion were made in a very unscientific manner. We simply sensitized some plates by the wet process, and then scraped the glass with a bone spatula in the dark-room. Half a dozen twelve by ten wet plates gave plenty of material for experiment, and the jelly thus secured was re-dissolved with alcohol and ether. This is not only a very roundabout and unsatisfactory plan of going to work, but the emulsion so secured is, moreover, far from sensitive. Pictures taken with it lacked density, and it was only by adding a little more nitrate of silver dissolved in alcohol that results at all passable were to be obtained. Since then many and various have been the directions given in this journal, and others, for the preparation of collodion emulsions, and the result is an *embarras de richesses* in the shape of processes. Under these circumstances the publication of a special work upon emulsion processes, and by one, too, who is *facile princeps* in such things, will be welcome to us all. Recently one fact has become very evident: that gelatine in emulsions cannot very well be ignored; and much as gelatino-bromide has been deprecated by many, its claims to consideration cannot be overlooked any longer. The great amount of rapidity enjoyed by Swan's plates can be traced, we think, in great measure to the use of gelatine; while there cannot be a doubt as to the quickness with which Mr. Kennett's pellicle acts under favourable circumstances. So far as our experience goes in the matter of gelatine films—and we admit it is very limited—the main obstacle to be overcome in working with this substance is the tendency of the surface to invite the deposition of dust particles. In developing or washing a silver film, dust particles, if they do fall upon the plate, are easily washed off; but with a gelatine film, all the rinsing in the world will not remove dust when it has once attached itself to the viscid surface. But the great advantage of all these emulsion processes is that they do away with the necessity for a silver bath, and all its cares and troubles. If we can only get them to work as uniformly and as well as the ordinary wet process, there can be little doubt as to the grand future in store for this branch of photography.

The Observations of the Total Eclipse.—The total eclipse of the sun in the Western States of America has been observed favourably, it would seem, at every station where the observers were located. Photography, as a matter of course, has again been called upon to assist in recording the phases of the phenomena, which, however, so far as the corona and protuberances are concerned, was not very marked. The corona—by which we understand the bright halo, or glory, that is seen around the place where the sun should be when eclipsed—is said to have been much less brilliant than on former occasions, while only one protuberance—those tongue-like flames which had previously been remarked in some number—was visible, and this but faintly. We cannot expect, therefore, such good photographic records as we already possess of corona and protuberances. The spectroscope showed but faint indications of hydrogen in the corona, and altogether, it would seem, that some of our former theories, based on previous observations, will have to be revised. We appear to have gone ahead rather too fast in some of our deductions, for the result of this last eclipse observation does not tend to confirm the ideas of several of our more sanguine astronomers. We are not altogether conversant with the nature of the efforts made to photograph the phenomenon; but, from accounts published so far, they seem to have been—upon the part of Mr. Lockyer, at any rate—of a very elementary nature; an ordinary portrait camera, in fact, is said to have been the instrument employed. Now, in face of the very important results which M. Janssen has lately secured at Meudon, by extremely short exposures, it seems a pity that trial should not have been made in the present case of a rapidly acting camera. A photograph of the sun or the corona seems an easy thing to secure, and so it is, if you take no special care in the matter, the result being a white disc, or white fringe round a black disc as the case may be. But M. Janssen has shown that if the exposure is properly timed, you can secure something more than a disc of monotonous white or grey. If you reduce the period of exposure to such a short duration that the picture does not become solarized, you get half-tones of which otherwise there is no trace at all. To get this result, M. Janssen has, it is true, to work with exceeding rapidity, giving but one three-thousandth of a second to each exposure; but he succeeds in controlling his exposures in this way, and there is no reason, therefore, why the observers of the eclipse should not have done the same. In the case of the corona, which is so very much less bright than the sun itself, there would be no need for such extreme rapidity; but probably one-thousandth of a second's exposure would have shown us the existence of much more than the ordinary method of working exhibits. It is a pity, indeed, that M. Janssen himself, who has simply more experience than any one else in the practice of photo-astronomy, should not have been invited to make one of the observers. The expense is really not worth discussing, while the experience of a *savan* who has made such brilliant discoveries with the photo-camera, and has, moreover, personally employed it on various expeditions, would have been simply invaluable. Of M. Janssen's willingness and enthusiasm to undertake such work there can be no question, and our readers will remember that, unable to make his exit from Paris during the siege by any other means, he, in his anxiety to get to Japan to watch the Transit of Venus, availed himself of the balloon post.

Why some Carbon Prints turn Yellow.—We see that a grand discovery has been claimed for Mr. Tunny, of Edinburgh, who has found out that the fading of carbon prints is frequently due to the transfer paper on which they are placed. We do not know about the discovery being a very great one, but the fact remains, nevertheless. There cannot be a doubt that in many instances where the sky and high lights are yellow, the fault is with the transfer paper, and nothing else. Let those who doubt this look at any old samples of transfer paper they may happen to have by them, and which they will find more or less yellow. We pointed this out, our readers may remember, in this column in April last, under the heading "Why some carbon prints turn yellow."

THE TOTAL SOLAR ECLIPSE.

Further communications from the best seats of observation of the late Solar Eclipse will be read with interest. The *Times* says:—

"The news received from the observers of the total solar eclipse will be for the most part readily understood by those who have read the preliminary paper on the subject in our columns on the 29th ult. Yet in some respects the information must certainly appear to many far from clear. For instance, some may not immediately perceive the meaning of the statement that 'both the H lines were reversed,' or that 'very bright lines near large B and also bright lines F and 1474 Kirchhoff were observed,' while the 'inter-mercurial planet' into which the telegraphists have metamorphosed the doubtful Vulcan must be an enigma to those who are not aware that for some time past astronomers have been divided on the question whether there exists or not a planet travelling within the orbit of Mercury—that is, an intra-mercurial planet (not an inter-mercurial one). We propose briefly to consider the results which have been announced from the seat of operations in the Rocky Mountains, taking the various solar envelopes respecting which information has been obtained in the order of their distance from the sun's visible surface (the photosphere, as the sesquipedalians prefer to call it). Our present remarks should be read in connexion with those which have already appeared in *The Times*

"First, then, let us consider the news respecting the sun's complex atmosphere, extending some 300 or 400 miles from his surface, and containing all or most of those vapours, metallic and otherwise, whose absorptive action produces the dark lines in the solar spectrum. All these lines were seen, as on former occasions, reversed when totality began and ended. But on this occasion, for the first time, the observers were able to distinguish known lines, and to note differences of brightness. Thus near B, one of the nine strong lines to which Fraunhofer assigned the first nine letters of the alphabet (and called large B in the telegram to distinguish it from a certain triple line called little b), several very bright lines were seen. Dark lines belonging to the oxygen and nitrogen of our own air have been observed in this part of the sun's spectrum, and it may be that we here have evidence corroborating Dr. H. Draper's recognition of bright oxygen lines in the solar spectrum. 'Bright line F was seen,' but that being one of the hydrogen lines, its being seen was nothing new; it would have been surprising, indeed, if it had not been seen. The line 1474 Kirchhoff is one of the most interesting of all. It is the chief bright line of the corona's spectrum. It was once thought to be a line of iron, but Professor Young showed that this could not be the case. The presence of this line among the bright reversed lines, and its absence from the dark lines of the solar spectrum, as ordinarily seen, is an interesting discovery, if it has been certainly established. It would imply that the substance to which the line is due—a substance present in large quantities in the corona of 1869, 1870, and 1871—exists ordinarily at a temperature higher than that of the vapours in the sun's atmosphere; for these absorb more light than they emit, which indicates that they are cooler than the sun's surface beneath them, whereas the matter producing the line 1474 Kirchhoff must be as hot as the surface of the sun, since it emits at least as much light as it absorbs. We would recommend to the special attention of spectroscopists a re-examination of the solar spectrum in the region of this line; for, as will presently appear, the sun's surroundings are not now in the same condition as they were in 1869, 1870, and 1871, when special search was made for the 1474 line. The statement that both the H lines were reversed is important, as showing that the whole range of the visible spectrum was examined for these reversed or bright lines. The H lines are near the violet end of the spectrum. They belong to calcium, and, as calcium has been recognized at times in the sierra, we can hardly attach special importance to the fact that these lines were seen in the more complex spectrum of the solar atmosphere below the sierra. The observation was probably only mentioned to show that the array of bright lines was traced up to the violet end of the spectrum. Indeed, quite possibly the bright lines near B were only mentioned for a similar reason, B lying at about the same distance from the red end of the spectrum as H from the violet end.

"Turning next to the sierra, or chromatosphere, we learn that on this occasion its height was far less than in 1869-1871. A query is attached to the height, 2,000 miles, mentioned in the telegram; but probably the doubt related to the number of cyphers only, not to the '2,' and, if so, we need not concern ourselves with it; for unquestionably the sierra was not so high as 20,000 miles, or so low as 200 miles, the former being the height of a goodly prominence, the latter too small a height to be measurable at the sun's distance. The height of the sierra in 1871 averaged some 6,000 miles. But it had been noticed that this envelope had been shrinking as the sun spots diminished in number. The eclipse observations confirm those made by the method devised in 1868 for studying the prominences when the sun is not eclipsed. We thus learn definitely that this envelope, consisting of a mixture of hydrogen, helium (the unknown solar element), sodium, and occasionally magnesium, calcium, and other elements, shrinks during the time when the sun is free from spots to about a third of the height which it attains when the sun shows many spots, and is, we may infer, most actively disturbed. As the height is in this case a fair measure of the volume, we may say that the sierra has lost two-thirds of the volume it possessed in 1871; and again, as that volume exceeded that of the earth more than 18,000 times, it follows that the loss of volume experienced by the sierra since 1871 exceeds some 10,000 times the entire volume of this earth on which we live. It is clear that this implies a very remarkable change in the condition of the sun himself, though fortunately for us the change is not one which affects in any striking or obvious manner his emission of light and heat.

"With regard to the prominences, the evidence given by the eclipse accords (as we expected it would) with that obtained by spectroscopists. They have observed that the prominences had become less and less in number, and had still more remarkably diminished in brightness, and in the signs which they afforded of eruptive solar action. The eclipse observers saw only one prominence, resembling the 'horn,' which was the most remarkable feature of the eclipse of 1868. This single prominence was 'very dim;' indeed, the observers in Colorado did not see it at all, for though they mention two protuberances, they add that 'there was an entire absence of the pinkish-red flames observed on some previous occasions;' whence we may safely conclude that by protuberances they mean masses of red matter not extending high above the sierra. We thus find an explanation of the circumstance, which had been thought perplexing, that during some eclipses very carefully observed before the actual recognition of the red prominences no red flames were noticed. We now see that during an eclipse observed when the sun is without spots, the prominences might very easily escape recognition, at least by observers not aware of the existence of such objects.

"But, as was mentioned in our previous article, it was about the corona that astronomers chiefly expected to obtain information during this eclipse, and certainly the result has confirmed their anticipations. First, it was discovered that the corona had changed entirely in form, in size, and in the quality of its light, if not in its physical constitution, since the eclipse of 1871. As observed on that occasion, it extended to a distance of more than 1,000,000 miles from the sun. As photographed, it showed an extension of at least 700,000 miles. It was exceedingly complicated in structure. Multitudinous streaks, some few straight, but most showing curvature more or less complex in character extended from the edge of the sun, and gave to the corona the appearance of luminous hair waved wildly by the wind. (It will, of course, not be supposed that the coronal streamers were actually moving.) Again, the spectroscope showed that a portion of the coronal substance shone with special colours, indicating its partial gaseity. The interior and brighter portion, to a height of nearly 300,000 miles, shone visibly with three of the four tints belonging to glowing hydrogen, and, doubtless, actually with the fourth, though it could not be recognized. Messrs. Lockyer and Janssen, on that occasion, following a method of observation suggested by Professor Young in 1870, saw not the three lines (only) of these colours, but the three coloured images of the corona. They dispensed with the slit, which allows only a fine thread of light to be examined, and simply looked at the corona through the battery of prisms. The dispersive action of the prisms divided the single image seen directly into three, showing a red image in one direction, a blue image in another, and between these, nearer to the latter, a green image. Lastly, in 1871, the corona was not very bright. But on July 29 the corona had shrunk greatly in dimensions, and had increased correspondingly in brightness. It extended to ordinary telescopic vision, only about 70,000 miles from the sun's surface, which is considerably less than the heights of many prominences which have been seen on former occasions. Its brightness was estimated by Mr. Lockyer as exceeding tenfold that of the corona seen in 1871. It was comparatively simple in structure, showing only in two places indications of definite structure close to the sun. Several long rays were seen, however, and we shall look forward, with extreme interest, to the evidence obtained respecting these features. For it appears that the doubts which, in our article of July 29, we had described as 'no longer entertained' respecting the corona, though dismissed of necessity as regards all the complicated details photographed in 1871, still linger as regards the long straight rays, which did not appear on that occasion, and naturally were not photographed. The resemblance between these rays and those seen in Secchi's 'hole in a shutter' experiment, leads some to imagine that, like the latter, the former are produced by the sun's light shining on matter nearer to the eye than the interposed dark object—the irregular 'stopper' in Secchi's experiment, the moon in the case of a total eclipse. In reality the rays cannot be thus explained, unless we assume that our atmosphere or some other matter capable of reflecting light extends as far as the moon, which few will consider probable. We believe that the observations made on this occasion, and especially the photographs of the corona, will dispose definitely of these last remaining doubts respecting the solar corona. The occasion was a very favourable one for the purpose, many of the stations being high above the sea level. While the corona as a whole had thus shrunk in extent and increased in brightness, losing also the complexity of structure it had shown in 1871, it had changed still more significantly in another way. Dr. H. Draper and Mr. Lockyer, repeated the observation which the latter had made in 1871, but they saw no coloured images of the inner corona, and the spectroscopists saw no bright lines in the spectrum of the corona. In fact, the corona no longer showed those signs of being partly gaseous which had been recognized in 1869, 1870, and 1871. Not only so, but the rainbow-tinted background corresponding to the non-gaseous part of the corona showed no dark lines. It was not, therefore, reflected sun-light only or chiefly, as it had been in 1871, when Janssen recognized the solar dark lines in this part of the corona's light. It was, in fact, the light which comes from glowing solid or liquid matter. The inference seems clear that now, when the sun is without spots, the corona, geratly shrunk in size, and, as it were, drawn inwards towards the sun, is so intensely heated as to be self-luminous—a result not very surprising when we remember that the heat, even at its outermost part, is 100,000 times that of vertical sunlight on the earth. Singularly enough, on this occasion, when first decisive spectroscopic evidence was obtained respecting the intense heat of the minute particles probably forming the corona, the heat received from the corona was actually measured. The ingenious Edison, who has recently added to his feat of crystallizing sound (to speak fancifully) the seemingly not less impossible achievement of 'talking a hole through a deal board' (to speak strictly by the letter), has devised a most ingenious instrument, which he calls the tasimeter, or strain-measurer, for estimating small changes of temperature. This instrument was employed during the recent eclipse to compare the heat received from parts of the sky remote from the eclipsed sun with that received from the corona. It gave the clearest possible evidence of the fact that heat comes to us as well as light from this vast solar appendage.

"The last discovery to be noticed (as bearing at least on questions of solar physics) is in some respects even more important than any we have yet considered. Every student of astronomy knows that after sunset in spring and before sunrise in autumn, a faint illumination of the sky can be seen above that part of the horizon beneath which the sun lies. It has long been recognized that the lens-shaped light thus seen, called the zodiacal light, indicates the presence of matter surrounding the sun, to a distance exceeding, probably, that of Mars, and certainly that of Venus, from the sun. It had been suggested that the inner and brighter portion of this solar appendage might be recognized during total eclipse by an observer who should devote himself specially to the task. In the monthly notices of the Astronomical Society for 1869-70, page 149, Mr. Proctor, in a paper on 'The Solar Corona and Zodiacal Light,' pointed out the value of observations made at a distance of several degrees from the sun, a 'dark disc' being so arranged as to conceal 'a circular space extending a degree or so beyond the eclipsed sun' all round. During the eclipse of 1870, in anticipation of which this suggestion was made, Professor Newcomb endeavoured to observe the zodiacal light in this way. But he was not successful; in fact, the sky was hazy, and the circumstances in other respects unfavourable for an observation of the kind. On the present occasion, however, he has applied the method successfully. 'Professor Newcomb,' we read, 'who had erected a screen on a high pole, thinks he detected the zodiacal light extending six degrees from the sun.' The telegram containing this passage comes from an observer who would be likely to place very little faith in an observation of the zodiacal light during total eclipse, as he had, in fact, adopted the opinion that the zodiacal light is a terrestrial phenomenon. Professor Newcomb would be the last in the world, we think, to describe an observation in terms so vague, and we should not be at all surprised to learn that he was quite satisfied with his recognition of a zodiacal light. The observation is one which will probably be renewed on future occasions. It may turn out that the zodiacal light, like the corona, varies with the varying condition of the sun as to spots and other signs of disturbance.

"One other observation has been made which, though throwing no new light on the sun's condition, is full of interest. Search was made by several observers for an intra-mercurial planet. No such body seems to have been noticed by the observers in Colorado. But Professor Watson, of Ann Arbor, who was stationed further north, detected a body shining like a star of between the fourth and fifth magnitudes, where certainly no star or known planet should have been. The evidence could not have come from a more trustworthy source. Professor Watson is the discoverer of about a score of bodies belonging to the family of small planets which travel between the paths of Mars and Jupiter. He had doubtless carefully charted beforehand the region occupied by the sun on July 29, so as to be able at once to identify every star and planet visible in the sun's neighbourhood. Otherwise we should almost have been inclined to suspect, from the position of the star he saw near the sun, that he had mistaken the star Theta Cancri for a planet. It may be regarded as certain that some small body was visible close to the sun which was not one of the known members of his family. It is equally certain that this body must lie within the orbit of Mercury. Whether it can be identified with Lescarbault's Vulcan in another matter. That body, which many astronomers regard as altogether apocryphal, should have shone, if Lescarbault's observations were trustworthy, with brighter lustre than Mercury, and at least as brightly as a first magnitude star. Possibly the opinion is more correct according to which a number of small planets, and not a single large planet—Cyclopes, not Vulcan—attend on the sun, and what Professor Walker saw was one of these attendant Cyclopes. Future eclipses alone can resolve this question."

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THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

BY THOMAS BOLAS, F.C.S.

Lecture III.

Line Engraving on Metal Plates.

We now go back to the first photographic process discovered—that is to say, the first process which gave photographic representations which could be exposed to light without destruction—the bitumen process of the hard-working and patient Niépce. This investigator noticed that the residue left on the drying of certain varnishes became insoluble by exposure to light. About the year 1814 he covered metal plates with a bituminous varnish, exposed them in the camera-obscura, and, after exposure, he subjected them to the action of similar solvents to those originally employed in making the varnish. Under these circumstances those parts of the film which had been exposed to strong light refused to dissolve, while the unexposed parts dissolved, a negative image being thus formed on the metal plate. To convert this negative image into a positive, those parts of the metal which were uncovered by bituminous matter were darkened by the vapour of iodine, and the bitumen was then removed by the use of a more powerful solvent. By the application of a suitable acid to the bitumen pictures on metal, the bare parts were dissolved away, and engraved plates were obtained. Here is a specimen of bitumen or mineral pitch—a substance which is found in most quarters of the world. Let us powder a little, and pour benzole on it; you see that it dissolves quite easily, and the solution runs freely through this paper filter. You see that the solution is about as thick as collodion, or, perhaps, rather thinner. Now here is a carefully cleaned copper plate, such as the engravers use, and you see that I am going to clamp it down on to this turn-table. The next step is to flood the plate with bitumen solution, and then to make the table revolve quickly. Now it has revolved a few seconds, and I think the film will be dry. Here it is: I hand it round, so that you can judge for yourselves as to the advantages of this method of coating the plate. I know of no other method by which such a uniform and compact film of bitumen can be obtained. After coating it is well to put the plate aside for twelve hours, in order that the film may become harder. It is then necessary to dust it over with French chalk, to remove stickiness; and, after this, it is placed behind a transparency, and exposed to light. The time of this exposure may vary from twenty minutes to two days.

Here is a plate which has had the requisite exposure, and the next matter is to dissolve away that portion of the bitumen which has not been made insoluble by the action of light. Now, benzole is too energetic a solvent for my purpose, and oil of turpentine is not sufficiently active; but, by mixing these together, you can get any degree of solvent power which you may require. I will get Mr. Barker to treat this plate with the solvents. You see that he commences by flooding the plate with oil of turpentine, and, as this has not sufficient action, he pours it off, and adds a little benzole; this begins to produce an effect, and enables him to judge as to the amount of benzole which he may safely add to the oil of turpentine. He has added this quantity, and has now washed away all the soluble bitumen from the plate, which is next thoroughly rinsed with water to remove the oil of turpentine. You see how extremely sharp and well-defined the lines are. I next place the plate in nitric acid, so as to etch the lines where the metal is bare; and while the etching is in progress, I will get Mr. Barker to dissolve away the soluble bitumen from this glass plate, when we shall find remaining the bituminous reproduction of a page of letterpress, which I can show you by means of the lantern. Our first plate is now sufficiently etched, and when I have cleared off all the bitumen by rubbing with a rag and benzole, the plate will be ready for the printer. It is now clean, and I will hand it round for you to examine.

Mr. Barker has now the bitumen image on the glass plate, ready for the lantern; the image is now on the screen, and you see how sharp and well-defined the lines are; I take the plate out, and if you examine it you will notice that the letters are raised on the glass—they being, as you know, formed of insoluble bitumen. If we wish to etch the glass, it is merely necessary to expose it to the action of hydrofluoric acid, as I do now.

So much for the line-engraving process of Niepce; but before you go I want to show you that very perfect half-tone transparency pictures may be produced by means of bitumen. Here are some pieces of sheet gelatine, and some pieces of talc, which have been varnished on one side with bituminous varnish. I hold two of these, one being on talc and the other on gelatine, over against the lime-light, and you merely see even films of bitumen, but no image. There is, however, in each case a picture of insoluble bitumen imbedded in the films, and I will get Mr. Barker to dissolve away the soluble portions, so as to lay bare this hidden image. He will use a mixture of oil of turpentine and benzole as a solvent.

Supposing that the varnished side of the talc or gelatine is placed in contact with the negative, and the light is allowed to shine through it; those parts of the bitumen film which are under the perfectly transparent parts of the negative become insoluble, let us say, all through. Now, those parts of the film which are under less transparent parts of the negative do not become insoluble all through, but a skin of insoluble bitumen is formed on the surface of the bitumen film, this skin varying in thickness according to the amount of light which has given rise to it. Put a varnished and exposed gelatine sheet of this kind into the solvents, and note the effect. When the film is made insoluble all through, it resists the action and remains on the talc; but where only a skin of insoluble bitumen exists on the surface of the film, the solvents loosen and dissolve the bitumen from underneath this skin, and away it floats. Now you can understand why the bitumen process, in its ordinary form, is only adapted for the reproduction of subjects in extreme black and white, such as line engravings or letterpress. Now, if we wish to preserve the half-tone picture intact, we must expose through the transparent medium (talc or gelatine) so as to ensure every part of the insoluble image, whatever its thickness, being in contact with the transparent support. Those prints which Mr. Barker is developing were done in this way, the talc or gelatine being placed in contact with the negative. The small thickness of talc or gelatine does not render the image notably unsharp. It was only during the last week that I thought of making bitumen transparencies by this method of printing against the back of the film, so I have not had time to make many examples. Mr. Barker has now finished the washing away of the soluble bitumen from those which he took in hand some minutes ago, and as I exhibit them on the screen, you will see how perfectly all the gradations of half-tone are represented. You quite understand that a picture of this kind is solid, the gradations of light and shade being due to a greater or less thickness of bitumen, and that the essential points in producing them are to varnish a thin, transparent medium with bitumen, to expose to light through this medium, and then to dissolve away that portion of the bitumen which has not been acted on by light. The ordinary black varnish sold for backing glass positives will answer very well, and so will some samples of Brunswick black. Here is a transparency which was made with ordinary Brunswick black; remember, however, that some samples of Brunswick black are not sensitive to light, these being probably made with coal pitch.

I think that by the method which I have just indicated, very fine lantern slides may be produced, as there is an entire absence of texture or granularity, and it is probable that the bitumen pictures may be stained or toned without difficulty. As I told you before, I only recently thought of this method, and perhaps some of you will experiment with it.

On the table are some plates and specimens illustrating the process of engraving on bitumenised plates, and you will specially notice the great clearness and sharpness of the lines produced by this method. Messrs. Leitch and Co. have kindly lent me some of their photo-engraved plates, which you will examine with much interest. These copper plates have been covered with a thin film of iron by the electrolytic method, and as the film of iron is extremely thin, it does not in any way interfere with the printing qualities of the plates. When the surface of a plate begins to wear a little, and the impressions show signs of deterioration, the plate is sent back to Messrs. Leitch and Co.'s factory, where the film of iron is dissolved off by means of dilute sulphuric acid, leaving the copper plate as good as ever. The film of iron although so thin as not to injure the printing qualities of the plate, is nevertheless sufficiently thick to protect the copper from injury in printing. The plate having been freed from the first worn-out film of iron, is once more coated with a layer of iron, and is again ready for use. When the second film of iron is nearly worn away, and the printer approaches near to the true surface of the copper plate, the iron is again dissolved away, and a new coating of iron is put. According to this system, one really prints rather from a cast of the plate than from the original plate, and new casts are made as required.

Here are some admirable specimens of photographic engraving by Mr. Dallas, a gentleman who is always to the fore in matters connected with photo-mechanical printing.*

Before you go I wish to call your attention to a very simple and expeditious way of making engraved plates from line subjects. Here is a photo-lithographic transfer made from a positive, instead of from a negative, as is usually the case. You see that the ground is black, and the lines are white; in fact, by far the greater part of its surface is black. I now lay it on a zinc plate and pass it through the press. Now, what will be the result? I will tell you beforehand. So much of the paper being covered with printing ink, and so little being white, moist, and gelatinous, the transfer will slide over the zinc plate, and we shall merely get a smear. Here it is. I have here another transfer similar to the last, excepting that white patches are introduced on it wherever they can be introduced without falling foul of the picture. This is done by painting on the transparency with Brunswick black. On putting this transfer down on a zinc plate you see that it adheres properly, and we have a perfect image on the metal. As the white patches are now done with, I varnish them over, and you see that the zinc is covered everywhere except where the lines of the engraving are bare. The covering on the zinc is now made denser by inking and dusting with resin, as I explained in the last lecture, and the plate is then etched by dilute nitric acid. Here is a plate all ready inked and dusted; I place it in this dish of nitric acid, and allow it to remain a few minutes. I now clean off the ink, and you see the lines are engraved on the zinc plate. The plate may now be printed from in the copper-plate press, or, as zinc is not a convenient metal for deep plate-printing, it may be reproduced by the electrotype process.

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* After the lecture, Mr. Dallas informed me that he has been in the habit of coating the surface of his plates with iron, as described above.—T. B.

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PHOTOGRAPHS UPON PAINTER'S CANVAS.*

In order to secure a photograph upon ordinary painter's canvas, such as will serve as an outline and basis for painting, it is necessary to avoid covering the fabric with a coating of collodion, gelatine, white of egg, or other substances, so that the colours may hereafter be applied direct to the fabric; otherwise, when dry, the desiccated pigments would rise and split off from the surface.

The most simple method to attain the desired end consists in making the canvas itself the bearer of the sensitive chemical substance; in other words, to salt and sensitize it in the same way as albumenized paper. As, however, canvas has different qualities to paper, it is necessary to know something about these in dealing with fabric; and we have here set down the experiences of Herr Lütgens, formerly a painter and photographer at Hamburg, whose advice many will be glad to follow.

In the first place, it is necessary to stretch the canvas upon a frame, and to free it from dirt and dust. This is done by the aid of a little spirit, which is poured upon the canvas (in a horizontal position) so as to cover the fabric. With a soft clean rag, the canvas is well rubbed, until all the spirit has evaporated. If the canvas contains much grease this operation must be repeated.

The treatment with spirit renders the canvas suitable for taking the aqueous salting fluid more readily. This latter consists of a filtered solution of twenty grammes of bicarbonate of soda in three hundred grammes of water. The bicarbonate of soda is for the purpose of forming a slight saponification with the oil of the canvas, so that the latter may be accessible to water. The above named solution must be poured quickly and evenly over the surface of the canvas. The stretched fabric is moved backwards and forwards until there are no streaks or stains visible; then the frame is permitted to dry, but not in the sun or in the neighbourhood of a fire.

As soon as the canvas is dry, there is poured over the surface a solution of one gramme of salt in two hundred grammes of distilled water, or, if a blue tone is desired, sal-ammoniac is employed instead of ordinary salt. This solution is permitted to remain from four to five minutes, and then is run off. Drying follows as before.

Sensitizing with silver takes place in the dark-room. A solution of one gramme of nitrate of silver in thirty grammes of distilled water is poured upon the canvas, so that only that portion, however, is covered as is to be printed. The solution remains upon the canvas for two minutes, and is then poured off; drying, of course, takes place in the dark-room.

For printing, there is employed either a direct negative, or an enlargement secured through the medium of a diapositive. As the ground must remain pure and white, the canvas should be but slightly printed in direct sunshine. Fixing is done with hyposulphite of soda, which is allowed to remain upon the canvas for from twenty to thirty seconds only.

The canvas is now washed, and the picture treated in water to which two drops of sulphuric acid are added to every hundred cubic centimetres. After thorough rinsing in this water, it is dried once more, and is ready for the painter. If the picture does not come out sufficiently clearly, it is covered with oil and turpentine, when it assumes sufficient vigour.

Every touching of the prepared surface is to be avoided, and from the first operation to the last the back of the canvas should never get wet. As canvas in the market is very variable in quality, it is well to repeat the treatment with alcohol and bicarbonate of soda more than once, especially if the surface repel the aqueous solution and refuse to absorb it.

In the case of the print not being a success, the surface is moistened with water, and the photograph removed with a weak solution of cyanide of potassium, a soft rag being employed for rubbing until every trace of the print has disappeared. Then the canvas is thoroughly washed with water, and the treatment commenced again as before.

In order to secure enlargements direct upon canvas with the aid of a sciopticon, instead of common salt, bromide of potassium should be employed, the silvering being conducted as usual. The superfluous silver is washed off, and Wilde's preservative fluid is poured over. The image from the sciopticon is then thrown upon the stretched canvas (in a dark room, of course) and the image subsequently developed by the aid of an alkaline developer. The other operations remain the same.

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A GERMAN OPINION OF THE BRITISH PHOTOGRAPHS AT THE INTERNATIONAL EXHIBITION.

"To see ourselves as others see us," is always instructives and we make no apology, therefore, for reproducing the following from the *Photographische Mittheilungen*, anent the pictures of Great Britain exhibited this year at the Paris Exhibition.

"England has sent a good deal, and much that is good. The Kensington Museum in London has sent photographs of Majolica, which have been coloured so well by the pupils of the Museum that they are hardly to be distinguished from the original. They are exceedingly good examples of youthful industry, and particularly true to nature, and it would be well if similar work were done at the Berlin Museum. Payne Jennings, of Dublin, has forwarded some very beautiful landscapes of a reddish brown tone, which are mounted upon glass and surrounded by card of a pitch black tint, the whole having a very excellent effect.

"In landscape photography distinguish themselves the renowned Bedford (presumably the son), and also Bandoin of Jersey; particularly, too, Vernon Heath, by his large and beautiful landscapes, no doubt enlargements by the carbon process.

"Robinson has some very beautiful composition photographs—landscapes with figures printed in; and Slingsby, of Lincoln, has also pictures of the same nature. Robert Faulkner and Co., in London, have sent examples of children portraiture printed in red pigments, which have the appearance almost of red crayons.

"The Stereoscopic forwards a large collection of portraits of celebrities—in all more than a thousand heads, which are arranged in classes. There are members of parliament, men of science, artists, &c. Messrs. Elliott and Fry show enlargments, like crayons, in some places rather weak, but which are very effectively coloured. Leon Warnerke has, by way of examples of his dry process, some excellent positives and negatives. Langliss, of Ottawa (Canada), shows some landscapes and some examples of architectural photography equal to those of Rückward.

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* *Photographisches Wochenblatt.*

The Photographic News.

Vol. XXII. No. 1040.—AUGUST 9, 1878.

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ANOTHER CHARGE OF FADING IN CARBON PRINTS.

We learn from the pages of a contemporary, the "British Journal," that another source of fading in carbon prints has been discovered by Mr. J. A. Tunny, a well-known portraitist of Edinburgh. Mr. Tunny has for many years been identified with efforts for the purpose of securing permanent printing, and was one of the first and heartiest in his congratulations when Mr. Swan announced his process as a practical solution of the difficulties of carbon printing. He has been working the process commercially in his business as a portraitist, and would not willingly, we may assume, impugn its trustworthiness. If he be responsible for the sensational announcement of the discovery of another "unsuspected cause of fading in carbon prints," photographers might think there was grave matter indeed for their careful investigation and enquiry.

But, happily, there is, as a correspondent points out, no cause for anxiety. The discovery involves no discovery of fading in carbon prints. Mr. Tunny has simply met with a very bad case of discolouration of the transfer paper with which the print is finally placed. This discolouration is a thing which might very naturally have been anticipated. The common use of transfer paper consisting of paper prepared with gelatine and chrome alum legitimately brings the risk of change in the whites of the print, which consists of the bare surface of the prepared paper. The familiar tendency of gelatine, and, indeed, of all colloid bodies, so far as we remember, is to discolour when exposed to light and air. Gelatine and glue, and similar bodies, as well as varnish made of resinous and fatty bodies, invariably darken on exposure. To what extent the addition of chrome alum to the gelatine would increase this tendency we cannot say; but the slight change which time and exposure produce on even a thick layer of gelatine can scarcely be regarded a serious source of deterioration. That the use of gelatine in mounting was a possible source of trouble we foresaw very early in the history of the process; and in our volume on pigment printing, written nearly a dozen years ago, we remarked, "the only possible source of deterioration in the prints exists in the thin coating of gelatine with which the print is attached to its final support." Our correspondent, whose letter on this subject appears on another page, refers to the discolouration of Eburneum prints as illustrating the inevitable change effected in the colour of gelatine by time and exposure. The illustration is apt, inasmuch as the thick body of gelatine shows the change in a striking manner; but we may add, that exposure in any specific degree is not necessary to effect this change. We were startled recently to note the low tone acquired by some of Mr. Burgess's examples which had been kept in a drawer for a few years not exposed to light. The change, it is true, was not an offensive one, as the tone produced more nearly resembled a deep tint of india paper than that in the white of a faded silver print.

Fortunately, the risk of any such change is not at all necessary, as it is possible to transfer to plain paper without the use of gelatine. In our twelfth volume, ten years ago, Dr. Vogel described a series of experiments which showed that the use of gelatine in transferring was quite unnecessary, as transfer to plain paper was a simple and safe proceeding. Whether this conclusion was verified by extended experience, or whether a prepared transfer paper must necessarily change with time and exposure, we are unable to say.

But there is an important fact to be borne in mind in connection with the last remark. That prepared transfer papers do not necessarily change there is abundant evidence. We have examined Mr. Swan's early prints, and find them unchanged during the exposure of many years. But we may—and, in fact, in justice, we must—go further than this. We have seen many hundreds of the prints of the Autotype Company finished presumably with transfer paper as usually prepared, in which no deterioration of the whites was apparent. We do not possess any examples of the Autotype Company's work since the firm existed in its present form, with the exception of the few prints we have recently submitted to light to test for the fading predicated by Dr. Van Monckhoven, and these, we are bound to add, remain as pure in their whites as unchanged in the dark portions. Mr. Tunny's experience, then, would seem to be altogether exceptional; and whilst valuable as suggesting the need of caution in a special direction to be traced out, is clearly baseless as suggesting any hint of fading in carbon prints.

After the foregoing brief article was in the hands of the printer, we received a communication from the Autotype Company which throws a curious and interesting light on the subject. It appears that our conjecture was correct that the gelatinous coating on the paper is a source of the mischief, changing, as it does, under certain conditions, when exposed to light. But it is not the sole source. The actual *fons et origo mali* is found in the paper used. We have before us examples of the transfer, double and single, prepared by the Company, which show that on exposure the gelatinous coating changes its tint, and acquires a degraded tone. But it only does this on some samples of paper, the same preparation on other papers remaining unchanged in the presence of light. The examples before us show transfer paper from the same piece, kept in the dark, and exposed to light. The original colour, retained by that kept in the dark, is a pure white, whilst the exposed portion is very much darkened. Another sample, exposed and unexposed, remains a pure white, showing that the preparation, if at all sensitive to light, is only so on some samples of paper. On reading the communication of the Autotype Company, it will be seen that strips of plain paper from the offending sample changed in the light without receiving the transfer preparation. In this case it would seem that the paper alone was in fault, without the aid or influence of the gelatinous coating, in which case it would seem that our suggestion as to the changeable character of gelatine was not applicable in the present instance. The tendency of such substances to discolour on exposure is an element in a question of stability not the less, and suggests the importance of being chary in its use. We may repeat, in conclusion, that nothing in the case, as stated, in the slightest degree impugns the stability of carbon prints, or suggests any notion of the existence of another cause of fading.

There is one final word which should be added in relation to this discolouration. We find, in speaking of it, the tint produced has been described as that of cheese. The term is not very exact, as cheese is of very varied colour. It was first used by Mr. Sutton, many years ago, to designate the tint produced in bad cases of fading in silver prints. Whilst not precise, there was a sort of offensive aptness about it which made it stick. But if it lacked precision in regard to silver prints, it is utterly inapplicable to the changed transfer papers before us. Change in such a case is quite undesirable, but the change is, if change were inevitable, as little offensive as possible. It closely resembles the india tint chosen by engravers for their work. We compare it, as we write, with the toned paper of a printed book before us, and the tints of two are quite undistinguishable. One other final word, to do justice to the Autotype Company and their promptness in taking up and noticing publicly the charge thus brought against carbon prints, which, fortunately, turns out to possess such a slender foundation.

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PARIS CORRESPONDENCE.

BY D. WINSTANLEY, F.R.A.S.

Letter No. 3.

A railway journey from Granville to Paris is scarcely worth describing. Mine bored me dreadfully in its "eventuation," and, I have no doubt, a recital of its incidents would (should I happen to have any) bore my readers too. The country through which you pass is tame in the extreme, and, what with the wretched ambling along the line, the numerous stoppages, their long duration, and the miserable formalities through which you are obliged to go, your patience is about certain to find its end long before you reach the Parisian rampart, and are tortured by a second examination of your baggage. But once in Paris, you are well rewarded for your toil. If you have wondered how the French, though so near us, are so much behind in railroad speed, you wonder now how we, so near to them, should fall so wretchedly behind in the construction of our towns. Compared with Paris, London is a stink-pot; compared with London, Paris is a dream. The Londoner builds his narrow, treeless, dismal red brick streets, and relieves them here and there by a few wide pretentious ones, having an air of gloomy and inflated grandeur. He does his best to blot out the sun by a canopy of smoke from a hundred thousand hideous chimnies, or, I dare say, more. He drinks his brandy, gin, and so forth, in close and stifling rooms, and in summer reeks perspiringly the while. The Londoner—in fact, the average Englishman—seems to live only for the purpose of accumulating gold, that he may die rich and envied, and to be paragraphed in the *Illustrated London News* amongst the crowd of other foolish people who show, by the way in which they leave it, how little they were ever fit to be the recipients of wealth.

The Parisian constructs his magnificent boulevards and avenues, his places and his rues, with their architectural monuments of superlative magnificence, and their thousands upon thousands of luxuriant and well cared for trees, beneath the shade of which he sips his claret, or gently puffs his cigarette. From his thousands of chimnies no smoke is seen to rise, for his charcoal fires do not pollute the optical transparency of the air. Externally, at least, the Parisian is a gentleman, and his soul intensely loves the beautiful—the beautiful in trees, the beautiful in flowers, the profusely beautiful in both, the beautiful in form, the beautiful in tint, the beautiful in substance, the beautiful in use, the majestical in size, the admirable in proportion, the superlative in quality, the unique in kind. He loves to dream away his evening hours in gardens arranged by him with incomparable taste; he loves the wild etherial strains of music played in the open air, and he loves the sound of falling waters; he loves the genius of liberty in a far higher and wider sense than we; he loves nature; he loves art, and loves to commingle them tenderly together; and he lives that, like a dream, his life shall pass away. He is a man of a thousand grand ideas; he dwells within the skies, physically in his numerous balloons, and ideally in the decorations of his mind.

The photographer who loves his art, and would spread a love of the beautiful amongst his countrymen by the beauty of his work, should make it his duty, as it would certainly be his pleasure, to pay a visit to the capital of France. The city would be certain to enchant him, for he would be quite unprepared for so much beauty as he will find at every turn. Viewing Paris from one of the many elevations which abound, he sees here the gilded dome of the splendid pile which rises above Napoleon's tomb, a monument to the dead incomparably grander than any other I have seen. The pale cold marble of the floor, looking cold, even beyond its nature, in the bluish light which falls upon it from the well-selected tint of glass used in the windows of the place, is a fitting reminder of the rigidity of death. The solemnity of the whole structure, and its expansive height, the twisted black marble columns, and the golden emblem of a future life, look vitally golden in the yellow light appropriately made to fall upon it. The massive block of granite which encloses the sleeper's dust, the tall and solemn figures supporting the circular marble parapet on which you lean whilst looking down upon the tomb, the banners soiled and torn in war, and the inscription commemorating the great soldier's wish that his remains might lie close by the Seine, and amongst the people whom he loved so well, form a *tout ensemble* appropriate in the extreme to an idea of the kingly dead; and though I believe myself that monarchy in any shape or form is but a monument to the imbecility of man, I cannot but admire profoundly the artistic genius which has produced Napoleon's tomb.

Looking further round you are struck by the magnificence of the Opera House, by the massive double towers of Notre Dame, by the monumental columns of the Vendome and the Bastille, and the couple at the Place du Trone, by the ruins of the Tuilleries, by the majestical proportions of the Louvre, and last, but not least, by the buildings of the Exposition.

Most of your readers will have read something touching its arrangements, and it is a matter for regret that accounts should be so varied, evidently influenced by the liberalism or conservatism of those who write. The undertaking is a grand one, whatever may be said by men who must needs condemn even the ground on which a republic contrive to live, and the censures which have been poured out profusely for its non-completion by the opening day are not the utterances of informed or considerate men. It must be remembered that the present Exposition far exceeds in magnitude any of its predecessors, and many new elements have been lavishly introduced. You may know to a minute how long it will take to fill a cart with bricks, but you cannot predict minutely how long a time must needs elapse in carrying out a new design. Unforeseen contingencies, seemingly without end, arise and produce unforeseen delays.

I have been surprised at the wonderful speed with which the works progressed; and though Frenchmen do seem to be uncommonly at ease, it often transpires to be the ease of perfect system, and gives rise to earliest and most abundant fruits. Complete or not, there was more to be seen on the opening day than could be adequately examined by a visitor spending ten hours a day within the grounds for a period of six months. Speaking from memory, there are fifty odd thousand exhibits of various sorts exposed, and many of them embracing a hundred or more articles in one exhibit; and if your readers think a minute sufficient to devote to the inspection of the average labour of, perhaps, some months, they may calculate for themselves how long a time would be consumed in paying even this brief glance to each of the exhibits here on view. Here is the beautiful cream-coloured building of the Trocadéro Palace, with its tall and handsome towers, their gilded summits surmounted by a streaming flag, and glittering in the sun; here the score or two of oriental buildings, admirably designed, and constructed with most faithful care, strewn about the Trocadéro grounds; here the Moorish mosque, and there the aquarium caverns, a delightful retreat in the burning heat of day with the thermometer at 90° Fah. or upwards in the shade; and the building of the Champs de Mars, the numerous stalls of which took me seven hours to pass without stopping to inspect one thing. Here is the magnificent department of Beaux Arts, stored with priceless gems: the pure, cold marble, and the canvas on which the genius of the artist has breathed the breath of life. Looking on these masterpieces I cannot but feel that I would rather be the author of one (only one) work *worthy* to live for ever, than have the gew-gaw title of a king to go down to posterity with Henry the Eighth, and the long line of intellectual blanks whose fortune it has been to enjoy unmerited privilege, or sicken the pages of history with their unseemly deeds.

The photographic departments of the Exposition, I fear, are scarcely what they might be, and when all is done there is a dreadful sameness in the works produced.

The Beaux Arts department is the school for the photographer, and the natural colour which makes a picture live is worth any sacrifice to obtain. I would suggest that the societies offer annually a substantial prize for any advance in that direction which is made. If the idea is adopted, I shall not compete myself, for though I think I have the key of the great result, I should not work for a reward suggested by myself, and life will probably be too short to work the whole thing out. But compare the pictures of the Exposition with the photographs yourselves, and you will, I am sure, agree with me that the attainment of colour is worth any sacrifice which you can make. The truth is, the photographs attract but small attention, and the progress indicated is extremely small. In scores of instances, one man's pictures only differ from another's in the accidental fact that the sitters were not the same—the size, the tone, the pose, the lighting, and the execution being so near akin as to suggest far more of the mechanical than a photographer likes to admit to be characteristic of his work. It is much to to be regretted that the stereo. on glass has so nearly gone out, for it is here, it seems to me, that photography takes its most important place. The pencil fails in minute work, and is quite useless for the production of results intended for binocular effect; but in large results for wall inspection photography is a very sorry substitute for painting—a very sorry one indeed.

I propose to touch in detail on some of the photographs and pictures in my next, but I dread the labour of a complete review of all the photographic work; and yet it is obvious that somewhere it should be given.

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A PHOTO-ELECTRO PROCESS OF ENGRAVING.

BY CAPTAIN J. WATERHOUSE, R.E., B.SC.

[The following interesting process is extracted from a paper by Captain Waterhouse which appears in the Journal of the Asiatic Society of Bengal.]

Geymet's method of photo-engraving consists in electrotyping from a gelatine relief obtained by the pigment-printing process, and is somewhat similar in principle to Placet's process, but as there are important differences and the process appears likely to prove of some utility, it may well be treated separately.

According to M. Geymet, who has very fully described the process and all the manipulations of preparing and electrotyping the reliefs in his "*Gravure Heliographique*," it was the invention of M. Audra, a French amateur.

Pigmented gelatine tissue is sensitised and exposed to light exactly in the manner described at p. 26 for the Autotype process. It is transferred to a smooth glass or a polished copper plate, developed in warm water, and when dry is metallised and electrotyped. If the subject is one in line or dot only, the above operations are sufficient; but if the subject is a photograph from nature, or any other with graduation of shade, it is necessary to obtain a grain, and this M. Geymet does by taking a copper plate with its surface grained or engraved with a ruled or roulette tint, inking it up in the ordinary way and then covering it with a coating of transfer collodion. When dry, the film of collodion is stripped off the plate, and carries with it the impression of the grain. This film is then placed between the cliché and the sensitive gelatine film, and serves to break up the shadows in the more transparent parts of the cliché.

A similar process has been used at the Depôt de la Guerre, in Belgium, for the reproduction of maps.[*]

Last year, whilst making some experiments on this process, I succeeded in obtaining the necessary grain by chemical means, which produce a finer and less artificial effect, and I have also made a few other modifications in the process, which may be worth recording at length.

A piece of the ordinary Autotype tissue is sensitized in a five per cent. solution of bichromate of potash. When dry, it is exposed to light under a reversed negative, and then transferred in cold water to the surface of a well polished copper plate, and squeegeed down into close contact with it. In order to prevent subsequent adherence to the newly deposited copper in the electrotyping bath, the copper plate is silvered by rubbing it with a little of the following solution mixed with tripoli:—

Nitrate of silver	1 part
Cyanide of potassium	10 parts
Water	100 ,,

The gelatine tissue attached to the copper plate is allowed to dry, and then developed in warm water in the usual manner, great care being taken not to loosen the lines, an accident which is very liable to happen, though the preliminary drying of the tissue before development tends to prevent it.

When the image is quite clear from all soluble gelatine, the plate is well drained, and plunged into a bath containing—

Tannin	5 parts
Strong spirits of wine	100 ,,

This at once removes all moisture from the gelatine relief, hardens it, and gives it a fine grain, coarser in the shadows than in the lights. The plate remains a few minutes in this bath, till the action is complete in the deepest shadows; the tannin is then washed off with a little spirits of wine, and the plate is allowed to dry.

The gelatine relief has now to be prepared for receiving the electrotype deposit. A band of copper having been soldered to it, the back of the plate is coated with Brunswick black, to prevent deposition of the copper upon it. When the backing is dry, the margins of the picture are cleaned with a little of the silver solution. The gelatine surface then receives a very slight coating of wax dissolved in turpentine, which is well polished off, and is rubbed over with fine plumbago or silver-bronze powder to render the surface conducting. The plate is then ready to be placed in the depositing bath.

Any good electrotyping arrangement may be used, but I prefer a Smee's battery with a separate depositing trough, containing a solution of ten parts each of sulphate of copper and sulphuric acid in one hundred parts of water.

A plate of copper, to serve as an anode, and connected with the silver plate of the battery, is laid horizontally about an inch above the bottom of the depositing trough, which should be large enough to allow the plate bearing the gelatine relief to be slipped under the anode. The relief-plate is connected with the zinc plates of the battery, and, when everything else is ready, the circuit is completed by slipping it into the depositing trough under the anode. By laying the plates horizontally in this manner, the deposit is more even, and the gelatine film seems to be more readily covered with copper.

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[*] See Maes and Hannot *Traité de Topographie, &c.*, p. 380.

When the deposit of copper is of sufficient thickness, it is separated from the matrix, and only requires a gentle "oil-rubbing" to be fit for printing.

The plates obtained by this method show very good half-tone with an almost imperceptible grain, giving the effect of a fine chalk-drawing.

I have lately tried to obtain the images upon the copper by the double transfer process, making use of a flexible temporary support, consisting of paper coated with india-rubber, as first proposed by Swan, which can easily be removed with benzole after the transfer of the gelatine image to the copper. The grain is given to the image by soaking it in water after the removal of the india-rubber paper, and then applying the solution of tannin in alcohol. This plan seems likely to be successful; if so, it will greatly simplify the operations, and enable engraved plates to be obtained from any ordinary negative without the trouble of reversing.

By electrotyping direct from the gelatine relief, the results are always rather heavier and coarser than they should be, because, although hardened and insoluble, the gelatine relief can always absorb a little of the copper solution in the depositing trough, and consequently the image swells and loses sharpness.

The strong tanning given to the gelatine film and the preliminary coating of wax before metallizing the surface obviate this defect to a considerable extent; but it may perhaps be better to obtain a matrix in lead by pressure from the gelatine relief, and then to obtain the printing plate by electrotyping twice from the lead matrix. This is a more round-about and expensive method, but is likely to yield finer results, and has been adopted by Woodbury and Rousselon in the processes next to be considered.

The process is simple, and, if it could be successfully worked out, it might be usefully employed in this country in reproducing shaded maps and for other miscellaneous purposes. It has the very great advantage over photo-collotype that the plates can be corrected, if necessary, and can be printed in any numbers in the ordinary copper-plate press without risk of breakage or damage to the printing surface.

WHAT DOCTOR VOGEL DOES WITH HIS OLD COLLODION.

In the *Mittheilungen* Dr. Vogel says a few words on the subject of old and unserviceable colodion, a material which all photographers have to deal with from time to time. It is too costly to throw away, and the next thing to determine, therefore, is how best to utilise it. Some photographers, Dr. Vogel tells us, mix their old yellow residues with a new material, and employ it as usual for coating plates. Such a method has, however, its disadvantages, irrespective of the circumstance that the plates are not so sensitive, and that the silver bath also suffers in consequence. Others, again, use old collodion for cleaning their plates, but in this connection it is much inferior to ammonia. The distillation of the alcohol and ether is an operation that hardly pays with such insignificant quantities of stale collodion with which photographers have usually to deal, and there is the fact, moreover, that it generally contains acetic acid. To burn in a spirit-lamp, old collodion is hardly suitable either, for as the liquid thickens, the wick gets clogged. Therefore, in all the cases enumerated, although old collodion may be used, it cannot be so employed with advantage. On the other hand, Dr. Vogel points out, it may be added to the developer very well, employed in the place of alcohol. After the sulphate of iron has been dissolved in water with some acid, as much of old collodion is added as of alcohol under ordinary circumstances. The pyroxyline, as soon as the collodion is added to the aqueous solution, is thrown down, and is then filtered off. The small amount of iodising salts contained in the collodion, Dr. Vogel assures us, does not affect the developer in the least.

EXPRESSION.

BY JAMES MARTIN.

The term "expression" is too frequently considered by beginners to apply entirely to the delineation of the various emotions of the mind or passions as depicted upon the human countenance; but more properly, it may be explained as meaning truth of drawing of all forms capable of being represented by the artist's pencil under the peculiar influences they were at the time when the picture was painted; and the more graphic the truth of outline is, the easier the observer can comprehend the story the painting is intended to tell; and the more spirit with which it is executed the more life will be infused into the production, until one may fancy the scene to be a reality. For the purpose of being thoroughly understood, I will say that the outline of the clouds tell the state of the weather. The peculiarities of the foliage, the force of the wind, the season of the year, the climate, and, if hill or valley, the strata of the rocks and shape of the mountains, are necessary to give truth to the whole; but there is an old proverb which is undeniably a fact, that the sublime is only separated by a slight difference from the ridiculous.

Exaggeration in design becomes caricature. When once this style of composition is adopted, everything is seen under the same grotesque character, and the mind of the pupil becomes so perverted as to unfit him for producing anything of a more elevated nature. It is the same with comic actors and writers, who, unless they show great wit and talent, had better give up their profession.

Misplaced exaggeration in design becomes clumsy vulgarity—in acting, buffoonery; in writing, bombastic inflation. Proportion in design not only bears relation to the difference of one figure, but also, as regards the relative sizes of all objects, in the same picture to each other, and conveys at a glance to the mind of the observer a correct estimation of the whole. I remember having seen a portrait of a farmer beside whom was painted a fat ox. The relative proportions of the two were such that either the farmer must have been twelve feet high, or the ox about three feet high.

Another instance of disproportion was in a country drawing master's specimen picture, representing "A wreck ashore," and one would have supposed it meant that the vessel of Brobdinag had run ashore on the island of Lilliput, and that her crew could easily step from her deck upon *terra firma*; and yet, taking all these objects separately, they would each have appeared to have been drawn in correct proportion. What, then, was the cause of this ridiculous appearance? Simply that in the one picture the farmer and the ox, and in the other the vessel and the cliffs, were placed upon contiguous planes. Had the ox been represented standing some distance behind the farmer, and the vessel in the foreground on the sand, the cliffs being about a quarter of a mile distant, the whole would have appeared in due proportion. Though these examples may seem more properly to apply to the rules of perspective, I think it may benefit beginners to know the simple cause of so fatal a misrepresentation.

Having now filled my usual space, I leave further remarks until my next article.

Correspondence.

"AN UNSUSPECTED CAUSE OF FADING IN CARBON PRINTS."

Sir,—If photographers have not gradually a rooted distrust of carbon prints, it will not be from lack of effort on the part of friends of the process to produce such distrust. The photographic community, just recovered from the scare into which it was thrown by Dr. Van Monckhoven's bogie, must prepare itself for another alarm. But remembering that the last turned out to be nothing more important than a ghost manufactured from a turnip lantern and a sheet, photographers will be slow to take fright. It must be admitted, however, that the announcement of another "unsuspected cause of fading of carbon prints," in your contemporary weekly journal, looks startling, especially when associated with a name so well-known as that of Mr. Tunny, a gentleman, by his own account, the earliest collodion photographer in this country—earlier, indeed, than Archer, the reputed discoverer!

When the story is told, however, there is no fading of carbon prints in the case, but merely the discolouration of some kinds of paper to which carbon prints have been transferred—merely, in fact, the discolouration of gelatine when exposed to light and air!

Mr. Tunny, it seems, according to the "British," having received some choice examples of chromotype printing, exposed them, partially masked, to sunlight. After "several days" he found not that the prints, or printed image, had changed, but that the whites were less pure, presenting the appearance of a silver print on albumenized paper when it gets into the yellow or "old cheese" condition.

Will you permit me, Mr. Editor, before going further, to protest against the "looseness" of expression which, in relation to tests like this, deals with "several" days? "Several" may be three, thirty, or three hundred. Surely, in making a test, it was worth while to note the precise number of days? The absence of precision in one point tends seriously to vitiate the whole transaction.

"After many experiments in the hope of discovering the cause of the dreadful deterioration," we are told that "a happy inspiration" suggested that the evil might reside in the transfer paper used. I should have thought, sir, that such a conclusion was inevitable to the meanest capacity, seeing that the dreadful deterioration existed in the whites—namely, the bare transfer paper. Experiment proved that this was the case, as slips of transfer paper exposed to light gave a similar result.

Voila tout! Here is no fading, no dreadful deterioration of carbon prints but a discolouration of transfer paper prepared, it seems, with gelatine and a chrome salt. Well, all kinds of paper will, we know, discolour in time, and the whitest gelatine will, we all know well, turn yellow, as the varnish on oil paintings will. But no one would dream of stating that an oil painting had faded because the varnish had acquired the yellow tone of age. Gelatine and similar bodies will turn yellow, or lower in tone, by age and exposure, as everybody knows. Let any one who possesses an example of Mr. Burgess's pretty Eburneum process examine it, and note the degradation of tint from a tolerably pure white to the deepest tint of India paper; but let him avoid rushing into print with an allegation to the effect that therefore Eburneum prints fade.

Possibly the double transfer paper now manufactured may be unusually faulty, since it changes so dreadfully in several days; but some of Mr. Swan's specimens, which have hung in my studio for several years, show no signs of that dreadful deterioration which in recent prints has been so speedily effected, and given occasion for a story as apochyphal in its import as the

Three Black Crows.

Sir,—A new, and till lately unsuspected, cause of deterioration in carbon prints has recently been brought to our notice, in such a positive and unmistakable form as to admit of no question whatever, and rendered it absolutely necessary for us to probe the matter to the bottom.

This new cause of evil shows itself in the discolouration of the transfer paper under the influence and prolonged action of sunlight. It has lately been our opinion that what has been termed fading in carbon prints is, as a rule, not a fading of colour at all, but a discolouration; and the cause, not any instability of the colour employed in the tissue, or anything used in the preparation of the transfer paper, but the actual discolouration of the paper itself.

Some time ago Mr. Tunny sent us some prints which he said had faded. These were prints made in Autotype tissue, the colouring matter being alizarine in combination with blue and black, both of known permanency. The prints were evidently discoloured in the portions to which the light had had access; those portions which had been covered by the mask retained their pristine brilliancy. We expressed our opinion to Mr. Tunny that no change had taken place in the colour employed, but that, somehow or other, the transfer paper had become discoloured. This matter we immediately proceeded to test.

On the 13th of June we exposed in a south window in the tower of our works strips of plain paper, and also strips of the transfer papers made upon the paper corresponding to the strips of plain paper. These were allowed to remain untouched till the 28th of July, when they were taken down and examined.

On that day we received a letter from Mr. Tunny, stating that he also had exposed pieces of transfer paper, had found them discoloured by the action of light, and expressed his opinion that the chrome alum employed was not to be depended upon, and that it underwent a change by being exposed to light. The specimens that he enclosed showed that a change had taken place, and there appeared an *a priori* reason for supposing that the change was due to something in the preparation of the transfer paper.

Fortunately we had taken the precaution to expose at the same time as the transfer paper strips of the paper before any preparation had been placed upon it, and we now lay before our readers the exact state of the case.

For transfer paper we use two kinds of paper, one a fine Scotch paper, the other a paper obtained from Germany of a very fine kind made expressly for us, and costing us 50 per cent. more than the best home-made paper in roll. These we marked A, B, C, as being papers made at different dates. We found the one marked A so slightly changed as to be almost imperceptible; that marked C had slightly discoloured; whilst that marked B had gone from a brilliant white to a cheesy colour. Now these samples of papers were exactly as they came from the rolls, without any preparation, chrome alum, or manipulation of any sort by ourselves.

The corresponding transfer papers had also changed their colour, but not to so great an extent as the plain paper, clearly proving that whatever may be the cause of the deterioration, nothing in the preparation of the transfer paper has anything to do with it.

The Scotch paper bore the test a great deal better, the discolouration being extremely slight, and the transfer paper made from it as nearly as possible unchanged.

On inquiry amongst our paper-makers, we find that it is a well-known fact that certain papers do change with the action of light, more especially that in which Esparto grass is employed in any quantity. In order to get this up to a saleable colour, it has to be bleached chemically to a very great degree—is probably tinted with aniline colour, which is of a known fugitive nature—the result being that the aniline colour flies, the bleach disappears, and the paper returns to its original hue.

Our own carefully-conducted experiments prove that the chrome alum is practically inert, and may be used with perfect safety; but it is necessary to guard against the proceedings of the paper-makers themselves. No doubt, in a variety of circumstances, the discolouration does not signify—everybody knows how old books, old engravings, framed diplomas, and show-cards in shop windows, are constantly seen in a discoloured state. We have before us a lithograph of the city of Paris, the centre of which has discoloured, leaving about three inches all round, where the stretcher covers, of the original tint.

But all this does not touch pigment printing, excepting that it shows the absolute necessity for testing the paper before it is used. A six weeks' exposure to a summer sky in a south window is a sufficient trial for any paper: if it is practically unchanged after passing that ordeal, no fear need be entertained of the permanency of the carbon prints placed upon it.

It would be interesting to know how much of the discolouration, the abnormal discolouration, of silver prints of late years is due to the paper. Does not this go some way to account for the extraordinary discrepancies in the behaviour of silver prints? The most careful treatment, perfect washing, the best manipulation in every stage, may be completely neutralized by some treatment the paper may have received before ever it comes into the hands of the persons who prepare it for photographic purposes.

Amongst all our own papers we find only one batch really bad, and another that is slightly imperfect. It was scarcely possible to foresee the weak point in this matter. The imperfect paper was bought as a paper of the best quality, from a maker of reputation. Economy has always been out of the question with respect to the Autotype Company; they have always bought, to the best of their judgment, the highest class of material that money could command, and it is unfortunate that the weak point was not discovered before; now that it is found it is easy to guard against it. It must also be remembered that the paper, even at its very worst, although it may discolour under a six weeks' exposure to a summer sun, changes but little exposed in a room, or under ordinary circumstances; but it is of the greatest importance to insist that our paper-makers shall supply for all photographic purposes absolutely pure and unadulterated material.

The Autotype Company.

IRON SPOTS IN PAPER.

Sir,—We notice in your issue of July 26 a letter of Mr. Durand's respecting photographic papers. Whatever may be the defects of the Saxe paper, we can say positively that the Rives paper has improved very much indeed to what it used to be ten or twelve years ago.

As the agents in this country, and as preparers of albumenized papers which find their way all over the world, we can assert that we have not for years received a complaint of iron spots; nor have we received any such complaint from the trade buyers, with one exception, whose complaints are as varied as they are frequent, and who never is, and never will be, satisfied with quality, price, or any condition of things. We think we may fairly assume that iron spots, practically speaking, are not now found in the Rives paper. Photographic paper is very often unjustly made a safety-valve for all or any short-comings connected with the production of photographic prints.—Yours obediently, Marion and Co.

22 & 23, Soho Square, London, August 8th.

Talk in the Studio.

Caution.—Mr. Protheroe, of Bristol, sends us the following as a warning to the trade generally:—"The trade in general are hereby warned of a thief going around purloining anything photographic after being admitted on any premises on a plea of charity or starvation. He says he is an American by birth, is about five feet nine inches high, twenty-four years of age, dark complexion, black hair and eyes, thick eyebrows, slight black moustache. Wears light tweed suit and black hat; is a photo. printer by trade." There is a warrant awaiting him at Bristol for stealing about £120 worth of lenses from Mr. Protheroe, photographer.

West Riding Photographic Society.—This Society projects an excursion on the 14th instant, to Bolton Abbey, where they will meet the members of the Sheffield Photographic Society, which we are glad to learn still exists. Ladies will be permitted to join the excursion, and all will meet at Ilkley to partake of high tea.

Cyprus.—Mr. Stephen Thompson, many of whose photographs adorn the British Museum, is about to start for Cyprus in order to take a series of views of that island for the Queen.

The Eclispe of the Sun.—The following telegram has been received from Mr. Locker. It contains the fullest account of the results of the Eclispe, and of the conclusions arrived at by some of the most eminent of the observers engaged on it which has yet been published:—"Corona smaller and less brilliant than in 1869 and 1871. Hydrogen taint in corona. Generally invisible, as was also the case in 1874. Ranyard's polarization confirmed Young's law, both (?) and lines brilliant. Corona probably photographed in Siam (?). Fluorescent eyepiece worked well Bright line near B; heat line in ultra red by thermopile. Waston's Vulcan, Right ascension 8deg. 26min, declination 18deg. N. Result—lower temperature of corona gas, as confined to chromosphere; almost entirely continuous spectrum, isolated from gaseous spectrum. Corona changes with sun-spots, and prominences increased. Continuation of absorption with deficit in ejected hot matter induces solar radiation. Young, Watson Draper, Locker cable above."—*Times*.

New Method of Precipitating the Gold Contained in Old Toning-Baths.—*F. Haugk.*—The baths when no longer fit for use are filtered into a white glass flask, rendered alkaline with a little bicarbonate of soda, and a concentrated alcoholic solution of magenta is added drop by drop until the liquid has taken the deep red hue of syrup of raspberries. The flask is then exposed for six to eight hours to the light of a bright window. At the end of this time the gold is found to be deposited as a violet powder, whilst the supernatant liquid has become colourless. It is carefully decanted, so as to preserve merely the deposit. When a sufficient quantity of protoxide of gold has thus been collected, it is carefully washed upon a filter, dried, and the filter is burnt. The dry residue and the ash of the filter are then dissolved at a gentle heat in an excess of *aqua regia*, and the solution—diluted with distilled water—is separated from the insoluble substances by filtration.—*Chem. Centralblatt*, viii. 201.

Why Colours can Never be Photographed.—An American contemporary says, it is now universally admitted by chemists and physicists that natural colours can never be reproduced by the process of photography. There is a broad philosophical reason for his belief. Colour has no objective existence. It is simply the brain's interpretation of the rapidity with which the waves of the ray of light beat against the retina. Beats more rapid produce the sensation of mind known as violet; beats less rapid, that known as red. The violet and the red are nothing but the vibrations of the ether until they reach the optic nerve and communicate to that the vibrations which the brain translates. Until colodion, or some other sensitive agent, can be made to vibrate like the optic nerve, and can be endowed with intelligence like the brain, the undulations that fall upon it in a ray of light will remain undulations. and nothing more. In other words, it is as impossible to photograph colour as it is to photograph sound.

A Possible New Force in the Solar Rays.—M. Forssman, who has been making investigations on the action of variously coloured lights on the galvanic conductivity of selenium, concludes that it is not the light vibrations or certain kinds of them that produce variations of conductive resistance, but vibrations of another order which he thinks have neither lighting, heating, nor chemical action. This opens the road to further researches to discover whether this hypothesis be true, as, if so, its verification would be of the highest scientific importance, and amount practically to the revelation of a new mode of motion.—*Scientific American.*

Some Idea of the Origin of Optics.—The ancients were familiar with the elementary principles of optics, and Euclid and Ptolemy developed them in formal treatises. They appear also to have been acquainted with the use of convex and concave glasses; but the former do not appear to have been applied to spectacles till the thirteenth century. Roger Bacon, about 1250, described telescopes and microscopes exactly, and yet neither were made till the beginning of the seventeenth century, when one Metims, at Alkmarr, and Jansen, of Middleburgh, made them about the same time. Another German of the name of Drevel soon after made microscopes. Galileo imitated their invention by their descriptions and made three, one which magnified a thousand times; and having with these discovered Jupiter's moons and the phases of Venus, telescopes soon became very popular, and were improved by Zucchi, Huygens, Gregory, and Newton, and finally by Martin Hall, Dolland, and Herschel. The famous microscope of Lewenhorek consisted merely of small glass drops or spheres. Prisms were first used in Italy, and their powers developed by Grimaldi. The theory of the rainbow was explained by Descartes, and the solar microscope was invented by Dr. Hooke.—*Druggists' Advertiser.*

To Correspondents.

C. Aldane.—For a small studio, the lean-to roof is the most convenient. You appear to have sufficient length at command for ordinary portraiture purposes, and the projected width of your room will serve. Length twenty-four feet, with width ten feet, will not give you such an inconvenient studio as you fear. The side-light should, of course, face north. Let the roof be all glazed, and join the side-light, continuing the glass to within twenty inches of the ground. Have six feet at each end of roof and side-light opaque, and each end, of course, opaque. Let the roof be twelve feet high at the highest part, and slope down to six feet at the ridge. Belgian sheet glass is the cheapest, and will answer every purpose.

Rapid Exposures.—We know nothing of M. Boissonnas' process except what we have published. In relation to the ordinary wet process, we can only repeat what we have before said. Various formulæ have been suggested from time to time, but the most trustworthy method of securing rapidity consists in the use of a nitrate bath in good condition, nearly neutral; collodion in good condition, containing a good proportion of bromide; a lens of large aperture and short focus; the best light that can be secured; and a strong iron developer, containing (say) fifty grains of protosulphate of iron and twenty minims of acetic acid in an ounce of water. With these conditions, patience, and skill, good results may be obtained with very short exposures.

Beginner.—For the coffee process, we should recommend two grains of iodide of cadmium, two grains of iodide of ammonium, and two grains of bromide of cadmium. The collodion will be in good condition for use three or four weeks after mixing, and will keep good for twelve months. About five or six grains of a somewhat powdery collodion, and equal parts of ether and alcohol. As a rule, we have found that a collodion which worked well wet will work well dry, but for dry work more bromide is desirable.

J. R. L.—We do not recommend india-rubber for mounting purposes. In the course of time the india-rubber will lose its adhesive quality, and assume the form of a powdery resin, the print curling up and leaving the surface upon which it was mounted. India-rubber is not such a stable substance as you suppose it is.

M. M. S.—Printing in the shade will, as a rule, give more brilliant prints with a weak negative than printing in the sun. But it is as you suppose, still possible to further intensify your negative Various methods have been proposed for increasing the intensity of varnished negatives. The method to which you refer as having been proposed by ourselves has always answered well with negatives treated with a spirit varnish. First moisten the film with spirits of wine, then apply tincture of iodine containing four grains of iodine in an ounce of spirit. As soon as the film acquires an olive tint, rinse with spirits of wine, and again varnish, and dry with heat.

G. F. L.—A matt varnish for transparencies may be made in several ways. Several recipes exist in which gum sandarac, dissolved in ether with benzole subsequently added, give a dull-surfaced varnish; but there is the drawback of some risk of dissolving the collodion film A safer varnish for such a purpose consists in a solution of gum-dammar in benzole, about thirty grains to the ounce, with five or six grains of white wax added. This is applied cold, and involves little trouble. Crystal varnish, or collodion, or a solution of gelatine to which zinc white has been added, also gives a very good result.

D.—The slaty tone of your prints is the result of a combination of causes. First, the negative is too thin and flat; next, the prints are not deeply enough printed; and, finally, they are much overtoned.

B. L. F.—It is a somewhat difficult thing to give any very trustworthy advice in relation to the defects of a commercial collodion the nature and preparation of which is kept a secret. Judging from the appearances of the print you enclose, the collodion is over-iodized, and would be improved by the addition of (say) one-eighth of its bulk of plain collodion. As a rule, when you purchase a collodion in two solutions, do not mix more than will be sufficient for three or four months' use. In this case you will do well to write to the manufacturer and ask his advice. 2. The white opaque mark on your plate after varnishing is due to the use of insufficient heat. Take care that the plate is heated evenly all over, and that it is kept near the fire until the varnish is quite dry. The white mark is due to the varnish having become "chilled" in that part.

G. A. (Winchester)—It is not uncommon for reflected light from a bright sky to enter the lens, and produce the effect of fog. Hence, it is wise to use a sky-shade in all such cases.

A. and S.—Your description is too indefinite to enable us to answer your question. If you send us the paragraph from the *Queen* to which you refer, we may possibly be able to help you. We do not know precisely what you mean by photo-chrome work. A certain class of portraiture was introduced some time ago in the United States under that name; consisting of an ordinary print mounted on the concave side of a watch-glass, made transparent and coloured. If this is what you mean, we think that no such process can be patented in this country, as it is not new.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. Pointer, Brighton,
Four photographs of Dogs.
Photograph entitled "St. Patrick's Day in the Morning."
Photograph entitled "He has Lost"
Photograph entitled "Triple Alliance."

Mr. H. R. Willett, Bristol,
Four photographs of Sydney Fletcher.

Messrs. G. & R. Lavis, Eastborne,
Photograph of Mr. G. Vulliamy.

Mr. W. T. Lye, Luton.
Photograph of himself.

Mr. J. Yeoman, Bedale, Yorks,
Photographic group of thirty-two Wesleyan Ministers, &c.

M. E. S. Baker, Birmingham,
One photograph of Monument to the late Mr. H. Buch.

Mr. Oakenfield Uxbridge.
One photograph of Pavilion in Cricket Ground, Uxbridge.

Mr. Thomas, Gloucester,
Photograph of Fossil Tree in a Coal Mine in Forest of Dean.

Mr. G. Bernasconi, Birmingham,
Two photographs of Mr Sothern.

Messrs. Davies, Brothers, Weston-super-Mare,
Photograph of the Lantern Hill, Ilfracombe.
Photograph of the Capstone Hill, Ilfracombe.

Mr. T. Sheeds, Hereford,
Photograph of Mr. J. N. Darby.

The Photographic News, August 16, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Captain Waterhouse on Photo-Mechanical Processes—The Electric Light in the London Streets—Grain in Gelatine Photographs.

Captain Waterhouse on Photo-Mechanical Processes.—No one has given more study, whether practical or theoretical, to the subject of photography as applied to the reproduction of maps and plans, than the present Assistant-Surveyor-General of India, Capt. Waterhouse. For many years past Captain Waterhouse has been entrusted with the superintendence of the work at the Calcutta Survey Office, and, as we at home know very well, he has from time to time been good enough to send to this country details of many improvements effected in the domain of photo-mechanical printing. He is probably more conversant with the four processes of photo-lithography, photo-collotype, photo-engraving, and photo-typography, than any in this country; and a work he has recently issued, reprinted from the Journal of the Asiatic Society of Bengal, gives a capital resumé of each and all of the methods of this kind that have been made known for some years past. We think many of our Paris confrères will be startled at the accuracy and completeness with which he has tabulated and described the hundred and one printing processes that have come to us from the French capital. Nothing seems to have escaped Captain Waterhouse, as if his distant stand-point had permitted him to take a better general view. But while his historical notes are remarkable for their accuracy, it is as a practical man before anything else that the Assistant-Surveyor-General of India deserves recognition. His collotype process for the reproduction of maps and plans is to be found in the place of honour in all text-books, the reason for this being that he has worked the method out practically with his own hands, and frankly communicated the fruits of his work to his brethren. We remember well, some years ago, his plan of printing maps was laid before a meeting of the Photographic Society of London, and we remember, too, that some very disparaging remarks were made at the time respecting Capt. Waterhouse's work. It was not novel, and moreover there were details recommended which were obsolete and impracticable. The author of the paper was necessarily absent, and unable to reply, and his critics had matters, therefore, pretty well their own way. But what is the result? That every manual and text-book refers to Capt. Waterhouse's printing method as one of the best and most practical. Indeed, of its kind, it is the only one of which clear decisive details have been printed. We shall in another number give some extracts from this last work, and merely on the present occasion draw attention to that portion of it which relates especially to the preparation of the original maps and plans to be reproduced. If the photographer is happy in the possession of a suitable copy to begin with, half his difficulties are at once got over, and it is for this reason that the author takes pains to point out how the original should be produced. For instance, white paper of smooth surface should be chosen—therefore not the rough drawing-paper which is not infrequently used—and the Indian ink employed for the lines should be freshly rubbed, so that it may give dead black lines. The lines, too, must be clean (not ragged) and firmly drawn, and intensity should be shown rather by thickness in the lines than by placing them close together. Captain Waterhouse does not forget even to tell us how to take out stains from the paper when they occur. But to appreciate Capt. Waterhouse's instructions properly, a photographer should first try his hand at following out the details given by other authors, say those of the late Sir Henry James, for instance. He will then be in a proper mood to value the working details given in this valuable book before us.

The Electric Light in the London Streets.—During the past week an extensive trial of the electric light has been made in London at the Gaiety Theatre in the Strand. It appears that the Jablockhoff or electric candle, which is in use in Paris, cannot be shown in London by reason of the large sum demanded by the patentees. More than a quarter of a million of money is asked for the right of using the electric candle in Great Britain, and the consequence is that search has been made for an alternative. This has been found in the Loutin light, or rather Loutin machine and Sérin lamp, for the two apparatus are combined to give the bright illumination to be seen every night in the Strand. The Sérin lamp is not unlike the Dubosq, in the way in which the carbon points are managed. It consists chiefly in mechanism to permit two carbon sticks, which are pointed, to keep near one another as they gradually waste away. To maintain the electric light constant, the two carbon points must be kept near to one another, at the same distance always, and this is rather difficult of management. But the great feature about the Loutin light is that which has made the electric candle a success. The current of electricity is reversed at stated intervals. The value of this quality in the Loutin machine may be pointed out in a few words. In the old electric lamp, the carbon sticks which approach each other did not long remain pointed. The electric light, which is between the points, if it did not in the general acceptation of the term consume the carbon, at any rate wasted it away. The electric fluid was always passing round in the same direction, and the consequence was that one of the carbon points or poles was always positive, and the other always negative. In these circumstances particles of carbon from the positive pole were constantly carried over to the negative pole, so that after a time, although the positive carbon stick remained pointed, the negative one by degrees grew club-shaped or concave. As soon as the two poles were no longer pointed, the light ceased to be regular, and the electric lamp became subject to "goings out"; hence those intervals of darkness with which all early experimenters with the electric light are familiar. Obviously, to make the light constant, therefore, it was necessary to maintain the poles in a pointed condition, and this the Loutin machine, as also the Gramme, is successful in doing, and in the simplest way possible. Instead of permitting the current to run round the circuit the same way always (in the same way precisely as a child runs round a table) a commutator is made use of, which reverses the current every minute. So that instead of one pole being always positive, and the other always negative, they change their character every minute, and the consequence is that the carbon wastes away equally, and the points retain their shape. We believe that in the Loutin light a small opal globe is made use of to distribute the light, the opal globe being again enclosed in one of ground glass, and in this way the illumination is rendered so soft and diffused that it may be gazed upon by the eye without discomfort. This spirited attempt to introduce electric illumination into London is due, we believe, to Mr. John Hollingshead, the well known lessee of the Gaiety Theatre.

Grain in Gelatine Photographs.—When Messrs. Bryant and May introduced safety matches to "ignite only on the box," it was observed by a commercial critic that the invention had come out after its time, his argument being that safety matches should have preceded the ordinary match, and then the inventor of the latter would have had no difficulty in making a fortune by selling matches "to ignite anywhere." A somewhat parallel case is afforded just now by carbon printing. While experimenters take credit to themselves for securing a grain in gelatine photographs (in order to produce photo-engraving plates), every carbon printer is asking how the universal reticulation that they are troubled with in summer, and which is nothing more or less than grain, is to be avoided. Cannot they help one another?

GERMAN CORRESPONDENCE.

BY DR. VOGEL.*

More about Hardened Glass—Applications of Electric Light in Photography—The Lightning Process in Europe—News from the Paris Exhibition—The Peroxide of Iron, and its Uses in Photo-Chemistry.

I communicated to you in my last letter some little experiments made with "hardened glass" (hartglas) for the benefit of its use in photography. Meanwhile, I had occasion to make some new studies about it. Herr Herrmann, ingénieur of the hartglas manufactory of Siemens, in Dresden, has brought some negatives on hartglas before a meeting of the *Verein zur Foerderung der Photographie* (Society for the Advancement of Photography) of Berlin. It makes a wonderful impression on anyone to see how those negatives may be thrown through the room and on the floor without any danger of breaking. This item alone is considerable enough to justify a cost of one-third beyond the price of common glass. Besides, Siemen's hartglas is considerably different from the original French make, manufactured by De la Bastie. German products are accessible to be ground and drilled, and the time is not far when it can be cut with a diamond without breaking. Already, now, Siemen's glass will break to pieces when violently treated, whilst the former French glass always crumbles into fine dust. I must not forget to say that the German method of hardening glass is entirely different from the French. Whilst the latter consists in cooling off in water or oil, ours is pressed between two even iron plates.

It is known that Siemens is our most prominent man in the practice of telegraphy, and all applications of electricity in general. I also owe to him detailed information about the application of electricity to photographic purposes, as it is put in practice by Mr. Vander Weyde, of London. He uses a medium size electro-magnet producing an electric light of four thousand to six thousand standard candles, at about six hundred and fifty revolutions per minute of the induction cylinder; size, 30″ by 28″ by 11″; weight, 419 pounds; price, £112; loose pulley, price, £2; large lamp with silvered parabolic reflector, about twenty-four inches diameter, and eight inches depth, on cast-iron base-plate, with ball and socket joint, £70. In addition to this, two carbons, 1s. 4d. per foot; and leading wire, £4 to £5 per hundred yards. This machine requires a force of four horse-power, which is not included in the above prices, and which will be about £300. After this first cost nothing more is needed to produce always the brilliant light of six thousand candles. One horse-power cost about 1s. daily in our country, so that four horse-power were amply paid with $2 daily. Then we also reach the point where electro light runs a great opposition to gas-light, when it is advantageous to use the same quantity of coal, which is fed in a gas retort in order to keep a steam-engine running, and thus illuminate the streets. It is not at all surprising to see several of these machines used in Paris. According to description its effect must be wonderful. Though the electric lights are shaded by ground-glass shades, their intensity surpasses that of the full moon. Americans are amply supplied with sunlight, so that they have no particular reason to think about artificial light, except for their magic lantern exhibitions. The electro-magnet is easily transported, and in regard to the driving power, a portable engine would answer splendidly for the purpose.

The news about lightning processes has attracted all attention in this country. It is quite strange that I read about it sooner in American journals than I have had occasion to hear about it by the inventor himself, who is M. Boissonas, of Geneva. Almost immediately after I had read your excellent June number of the *Philadelphia Photographer*, I received a letter from the inventor, with some samples, but without any description of the process. His letter was more a kind of invitation to visit on the occasion of my next visit in Paris also the studio of Franck de Villecholle, where his process is put in practice. The inventor now makes efforts to sell his process in England. His first trial was made in America—quite a good calculation. Let us hope that the secret will very soon be revealed. Mr. Seavey, the famous background painter of New York, accompanied by his amiable wife and daughter, has recently honoured me with a visit. He also visited Franck in Paris, where a nice picture of Miss Seavey was made in one second.

Meanwhile the news about the Paris Exhibition more and more engage the public. The opinions are very different. After all that I know of it, until now, the photographic exhibition shows some very good products by the old process, but nothing particularly new. A new Adam-Salomon, who was in 1867, on the same occasion, the centre of attraction, has not yet put in his appearance. It seems as if he had not even exhibited at all, as I have not seen his name in any of the reports about the exhibition.

The old iron process, by Herschel, for the direct reproduction of drawings without camera and glass negative, the so-called lichtpaus process, gains lately more and more attention. This process has the advantage of cheapness. Marion, of Paris, sells a liquid for this purpose to sensitize the paper. Everybody can make it.

A.—Ferridoxalate of iron	10 parts
Water	100 ,,

Also,

B.—Ferridcyanide of potassium ...	10 parts
Water	100 ,,

Mix A and B, and you will get an excellent sensitizing solution for sensitizing paper. It is not necessary to use Saxe or Rives paper; common drawing-paper will do. The sensitized paper will turn dark blue if exposed to the light, and turns white again if the exposure is continued. It has to be exposed until the blue commences to fade again. The fixing, which is done with warm water, renders those parts which are faded already a little dark blue. These papers are less sensitive than silvered papers, and require about three times the exposure of the latter. I publish these few notes, as I hear that some one is going to apply for a patent for an old subject in order to derive money from it. It seems also as if the iron salts were recently more studied than ever. Until now, the process with bichromate of potassium and gelatine has attracted all attention, so that all other sensitive substances were neglected. The above-mentioned process, which dates from the year 1841, is the first which guided to a practical application of iron salts in photographic chemistry.

Monckhoven also has lately called the attention to the use of iron salts in the carbon process, which has been proposed twenty years ago by M. Poitevin, who now also, in the French Photographic Society, points out again the same subject. Poitevin bases a new lichtdruck process on his experience. A glass plate is coated with gelatine which is made insoluble by the following composition;

Water	100 parts
Perchloride of iron	10 ,,
Tartaric acid	3 ,,

The film thus treated regains its solubility when exposed to light. Exposed under a positive, it will give a copy which is insoluble in all parts which were not exposed to the light, which will take printing-ink and produce a positive lichtdruck. This method enables us to make a direct reproduction of cards, &c.—that is to say, without the help of a negative. Poitevin says that it is also possible to make the film soluble again by acids, so that a negative may serve for the same purpose. In this case he coats a piece of paper with the gelatine, and treats it with the above solution; lets it dry, and exposes under a negative; develops then in warm water, and produces thus a negative on paper. If this is inked in, the whole piece will get black. Now the sheet is put in water to which a little muriatic acid is added. The film gets soluble again and washes out, whilst the ink on the paper only will remain and form a positive picture.

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* *Philadelphia Photographer.*

All these little remarks on iron show very clearly what an extent the use of iron salts may still have in photography. In consideration of the extended use of iron in the developer, and the new applications which Lea has given to iron in the alkaline developing process, it is quite useless to recommend especially the study of iron salts for photography. It is desirable to make them a little more sensitive, which may be possible by the test of many organic iron compositions quite unknown until now.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

BY THOMAS BOLAS, F.C.S.

Lecture IV.

Printing of Half-tone Subjects from Metal—Application of Asser's Process—Talbot's Photo-engraving—Woodbury's Methods of Engraving and Printing.

When treating of photozincography, I gave details of Asser's process, and I showed you a zinc plate bearing the fatty image. Since then I have etched that zinc plate, so as to convert it into a high printing block, suitable for the typographic press. Here it is; here is an electrotypic cast of it; and yonder is a proof from it, hanging side by side with a proof from the unetched plate. In comparing these proofs, you will see that a little of the detail has been lost during the etching; but this is not due to any defect in the process, but to the fact that I etched the plate too rapidly. In etching a plate of this kind, the re-inkings must be done with great caution, and the acid used for the earlier etchings must be very dilute—say, one part of acid to one hundred of water.

I hope to see Asser's process come into use for large and comparatively rough work, it being well adapted for this. Mr. Dallas has brought the manufacture of typographic blocks, for the representation of half tone, to great perfection, and he has kindly lent me some of these, and also prints from them. Although we do not know what method Mr. Dallas employs in making his "tint" blocks, we can all appreciate the excellence of the results.

The illustrious Talbot discovered a method of printing in half-tone by means of etched copper or steel plates, and very beautiful results have been obtained by his method, which I now intend to illustrate to you.

Here is a copper plate which has been carefully cleaned and charcoaled. I slightly warm this, and fix it on the turn-table. I next pour on it a warm solution containing

Gelatine	... ...	6 parts
Water	... ...	100 ,,
Ammonium bichromate	... ...	1 part

The table being now rotated, all excess of the gelatine solution is thrown off, and a thin even film is left on the copper plate. The plate must next be dried at a gentle heat, after which it is ready for exposure to light under a transparency. Here is a plate which has been so exposed, and you will notice that, where the light has acted, the coating has become brown, and at the same time it has become insoluble in aqueous liquids, the degree of insolubility depending on the extent to which the light has acted. The next problem is to etch through the soluble parts of this film without destroying its continuity. This cannot be done by nitric acid, as the acid destroys the gelatine film at once, but a strong solution of iron perchloride will answer the purpose. The plate being now put into this solution of perchloride of iron, the etching has commenced. Those parts of the gelatine film which have not been acted on at all by the light remain very soluble, and allow the etching to take place rapidly, while those parts where much light has acted resist the solution altogether, and those parts which have been acted on by a small proportion of light allow a proportionate amount of the iron perchloride to penetrate. Thus all degrees of light and shade are represented by corresponding amounts of etching. The plate is now sufficiently etched. I take it out, clean off the gelatine; and now it is ready for the press. Here is a proof from a similar plate.

The next process to which I direct your attention is one discovered, perfected, and carried out on a large scale by Mr. Woodbury. The Woodburytype process consists in casting coloured gelatine pictures in a metal mould. Here is a metal mould—the method of making it I will describe directly—in which the image is hollowed out, the depth of the hollow being greatest in those parts corresponding with the dark parts of the picture, and everywhere deep in proportion to the intensity of the shade. I place this mould in a dish containing blackened water, so that the water just runs over its face. You now see no picture or anything approaching to a picture. Now notice the effect of pressing a piece of plate-glass down on the surface of the mould. The excess of blackened water is forced out, and the hollows of the mould alone are filled up with the blackened water. Now, as these hollows vary in depth, varying degrees of shade are produced, and a perfect picture is produced. I take the glass off, and the picture disappears; put it on once more, and it re-appears. Instead of coloured water, I pour on this mould a little coloured gelatine, and press a piece of plate-glass down on the surface. The excess is forced out, and the mould filled with coloured gelatine. In a few seconds the gelatine will have set, and I shall be able to lift off the glass, which will carry with it the gelatine image. Here it is; it forms a transparency suitable for the magic lantern. If, after having flooded the mould with coloured gelatine, a piece of paper is laid on, and the excess of gelatine is forced out with a plate of glass, a picture composed of coloured gelatine is moulded on the paper, and can be removed as soon as the mould is set. When removed, it is dipped into a solution of alum, in order to render the gelatine image insoluble in water.

So much for the general principles of Woodburytype; and now let me show you how you can work this process yourselves.

The first thing is to dissolve about six parts of easily soluble gelatine, and two parts of lump sugar, in fifteen parts of warm water. Here is the warm mixture already strained through muslin, and here is a waxed glass plate, set level, and bordered with a little ledge of wood. The warm gelatine solution, being poured on, spreads itself over the plate, forming an even layer, which, in the course of some hours, will dry, forming a uniform sheet. Well, here is a dry sheet of the gelatine on another piece of glass, and you see that the introduction of a penknife under one corner of the gelatinous sheet brings it off the glass at once. The next thing is to make this gelatine sensitive to light, and for this purpose it is soaked in a solution of potassium bichromate, containing 3½ per cent. of the salt. You see that it has now become quite flaccid by absorbing the solution, and I now lay it on a sheet of glass, and remove the excess of solution by means of the squeegee. The bichromated gelatine adheres to the glass, but when dry it will be easily removable.

Here is a glass plate with a dry sensitive film on it. I take the film off, and place it under a negative. It is now ready for exposure to light, and would require about two hours of such light as we had to-day at noon. Here is a printing frame containing three such films, which have had the necessary exposure under their negatives. I put these films in water, and let them get moderately soft, but not so soft as the film became during the sensitising. One of these I take out and lay face downwards on a piece of finely ground glass, another is similarly placed on a piece of glass covered with gold-beaters' skin, and the remaining one is put down on a sheet of collodionized glass. The squeegee is now applied to each, and adhesion takes place. In order to enable the gelatine films to firmly fix themselves to the supports, they should remain at rest during a period of about half an hour; but as we cannot wait that time, I have provided a duplicate set previously prepared. Mr. Barker will now put these into warm water, and the gelatine soon begins to dissolve. Now, remember that certain parts of the bichromated gelatine have been made insoluble by the action of light shining through the negative, and these insoluble parts will remain undissolved on the supports (ground glass, gold-beaters' skin, and collodionised glass). It will take some little time for Mr. Barker to wash away all the soluble gelatine, but towards the end of the lecture you will see his results in the shape of gelatinous reliefs; thick where corresponding to the blacks of the picture, very thin in those parts representing the whites, and finely graduating between these extremes. When the reliefs have been sufficiently developed, they must be dried, and here is a finished and dry set. You see that, having only one hour, it is necessary to get continually in advance of the work, and to take fresh materials which have been previously worked up to a certain stage. Let me begin with the relief on finely-ground glass. This being gently warmed, I put a border of wood round it, and pour on some fusible metal, made by melting together—

Cadmium	1 part
Tin	2 parts
Lead	4 „
Bismuth	7 „

Well now, if I left this to cool in the ordinary way, the top would solidify first, and the lower layers of metal in contracting would leave small vacant spaces next to the surface of the gelatine, thus rendering the cast imperfect. To obviate this, I place the glass on this cold block of metal, and cover the top of the fluid fusible alloy with warm sand. The rest explains itself—the portion of fusible alloy next the face of the mould becomes solid first. Here is a fusible metal mould made in the way I have just illustrated to you; I oil it slightly, pour some coloured gelatine solution on it, and force away the excess by means of flat glass; and when the gelatine has set, the glass can be removed, carrying with it the moulded transparency.

Here is the relief on gold-beaters' skin, and here is the one which was developed on collodion. These can easily be stripped from their glass supports, as I now show you—one corner being liberated, off they come; I will pass them round for you to look at. Now, in the actual commercial practice of Woodburytype printing, a film relief, such as you are now passing round, is forced into a plate of lead by means of the hydraulic press, and the leaden mould thus obtained is used for printing. I now lay a film relief on the smooth steel base of this screw press, place a piece of lead on the top, and apply pressure. You see the result—the lead has become an exact counterpart of the gelatine relief, which you will notice is in no way damaged.

Here is a leaden mould, together with the corresponding relief kindly supplied by Messrs. Braun and Co., of Dornach, and here is a very fine mould made by Mr. Woodbury himself. I will make a cast in this, and you see that the result is one of Mr. Woodbury's magnificent lantern slides, which are now so popular. It is now projected on the screen, and you can all see it. I take it out, or the heat would melt the wet gelatine, and I pass it round for you to examine, but remember that it is not yet dry, so do not touch the face of it.

I think I explained to you that, in order to get a Woodburytype picture on paper, it is merely necessary to interpose paper between the gelatine, as poured on the mould, and the plate-glass cover, which forces out the excess. To illustrate the matter, I will print one from this mould. Now, notice the paper I use. It is thin, hard paper, surfaced with shellac, to prevent the gelatine from penetrating it, and heavily rolled, to make it even in thickness. There is much more which I should like to tell you about the Woodburytype process, but I have not time. You will not fail to notice the admirable collection of prints and illustrative specimens kindly lent me by the Woodburytype Company, Messrs. Goupil and Co., Braun and Co., Bruckmann, and others, who are working the process on a large scale, not forgetting these very fine specimens lent by Mr. Woodbury himself.

I may mention that, in actual practice, one Woodburytype printer can attend to several moulds, and by the time he has filled the last of the series, the first is ready to give up its picture. The moulds are arranged on a circular table, which revolves in front of the operator.

Mr. Woodbury has modified his process so as to obtain copper-plates suitable for deep printing in the ordinary copper-plate press, and this modification has been worked with the greatest success by Messrs. Goupil and Co., of Paris, who have kindly lent me these magnificent specimens of their work.

A gritty powder is added to the gelatinous mixture employed for making the relief, and, when the relief is made, it is found to be more or less rough, from the projection of the gritty particles. The relief is then rolled against a sheet of lead, so as to make a perfect reverse in this metal. As far as form is concerned, this plate of lead is perfectly adapted for printing in the copper-plate press, the hollows left by the projecting particles of grit holding the ink to perfection. But as lead is much too soft to be used as a deep-printing plate, the leaden plate is reproduced in copper by the electrotype process, two electrotypings being, of course, necessary, one to make a reverse mould, and a second to make a cast of this mould, or a duplicate of the original leaden plate.

ON FAILURES IN MAKING TRANSPARENCIES

BY E. W. FOXLEE.*

I have recently been shown some transparencies, the producer of which was loud in his condemnation of the Autotype Company's Special Transparency Tissue, owing to the spots, specks, and dirt that were evident enough in his work, and that he attributed to the tissue. A practised eye would at once have seen that the specks (and there were plenty of them) in these transparencies had not their origin in the tissue at all, but were introduced into the picture during the manipulations, and, as many persons seem also to think that if a carbon transparency is full of faults and imperfections they must of necessity be due to their materials, perhaps a few words on the subject may not be out of place in the next number of the *Notes*.

Let us take the manipulations as given in the latest edition of the *Manual*, and follow them out; we shall then see how, without special care be taken, spots, specks, blemishes, &c., may be produced. First, there is the sensitizing bath. What silver printer would think of using his sensitizing bath without filtering it? But what carbon printer thinks of filtering the bichromate bath before using it? The latter requires it quite as much as the former, and though the *Manual* does not direct it to be done, I think, with all deference to the Editor, that it ought to do so. It may not be necessary for ordinary work, but transparency making is *not* ordinary work, nor is it so considered at the Autotype Works, where a special department is organized for this branch.

Now one of the things of great importance is to see that the sensitizing bath is clear and free from scum and floating particles, and that the tissue is carefully dusted both back and front, for if any fluff be left on the back it will be washed off into the bath, and will probably adhere to the front of the tissue; a piece of clean wash-leather is very suitable for dusting the tissue with. Then care should be taken that the glass upon which the tissue is squeezed after removing it from the solution is perfectly clean, as any dust or particles on it will be forced into the tissue, and will in all probability be found in the finished picture.

Again, any dust that may settle on the tissue during the drying will also show—in fact, anything that is allowed to adhere to the gelatinous surface becomes a part of the pigmented gelatine, and enters into the formation of the picture. The gelatine used for coating the plates should also be carefully filtered before using, and special care taken that no dust is allowed to settle on the plates whilst drying, as it will be sure to make itself visible in the transparency; these plates, whilst wet, seem to attract dust very much as the old albumen plates used to do.

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* *Autotype Notes.*

The collodion for coating the tissue with should also be filtered before using, and the tissue carefully guarded from dust whilst in drying, as it will be impossible to remove any particles that may attach themselves.

Another important precaution required is to muzzle the nozzle of the cold water tap with fine muslin, so that the water used to soak the exposed tissue in previous to mounting it on the gelatinized glass plate, and also for the final rinsing after development, is filtered as drawn from the tap.

If great care be not taken in the drying of the finished picture it will probably be ruined by dust settling upon it while it is wet, and so spoil the work.

Transparencies should always be worked in white earthenware trays; it is next to impossible to ascertain if any other sort are perfectly clean, for without the greatest care and the most scrupulous particularity good results must not be expected.

The bichromate bath must always be filtered, the gelatine solution also, the collodion as well; the dishes must be absolutely clean; the water filtered from the tap; the tissue dusted carefully before use; the place in which the work is carried on should be well watered, to keep down the dust; and every precaution taken to eliminate all floating particles which attach themselves so readily to gelatinous plates. If all these precautions be taken, then, and not till then, will perfect work be produced.

Enough has been said to show that, however perfect the tissue may be, it by no means follows that the transparencies will be perfection, but that they may be and frequently are quite the reverse; also that spots, specks, &c., are by no means necessarily due to the tissue, but in most cases to imperfect or careless manipulation.

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ON THE ACCELERATION OF OXIDATION BY THE LEAST REFRANGIBLE END OF THE SPECTRUM.

BY CAPTAIN ABNEY, R.E., F.R.S.

In my first note on this subject it was stated that further experiments would be undertaken, in which sensitive films would be exposed to the action of the spectrum in atmospheres free from oxygen. These have been carried out by means of apparatus specially designed for the purpose, hydrogen and nitrogen being the atmospheres employed, and in some cases hydrogen vacua. In every case the experiments were confirmatory of what was previously surmised, the image showing no signs of oxidation, and there is evidence to show that the limit of sensibility of the compounds used is lowered towards the least refrangible end of the spectrum.

Exposure of films in solutions which readily combine with oxygen, and at the same with the halogens, have given most remarkable results. For instance, silver bromide, which by its colour should have proved sensitive to the red end, yet when exposed in the usual manner was insensitive below B in the spectrum, proved sensitive when exposed in sodium sulphite (Na_2SO_3), and arrived at the lowest limit (about W.L. 12,000) which I have as yet photographed. In the same solution, to quote another experiment, silver iodide proved sensitive to a point between *a* and A. The experiments were carried out in duplicate. In one the plate was immersed in the solution, and in another the salt was dissolved when possible in glycerine and applied to the film. Both methods answered equally well, but for some purposes the latter is more convenient.

My experiments also prove that what is technically known as solarization is due to the oxidation of the image, accelerated by light generally, be it the more or less refrangible end of the spectrum. This oxidation causes the formation of a compound which is undevelopable, as already has been pointed out. It has thus been found impossible to produce solarization in solutions which have oxygen absorbents. We may therefore conclude that the whole spectrum exercises a reducing action on the sensitive salt, and that this reduced compound is again capable of being oxidized by it.

The relative power of the two actions seems to vary according to the part of the spectrum. This subject is still under consideration.

In my first note I also mentioned that photography in natural colours probably depended on the same action. My surmise is confirmed to a great extent. If silver sub-chloride or silver sub-bromide be produced chemically, we have a dark compound formed which, if exposed to the action of the spectrum whilst in an oxidizing solution (such as hydrogen peroxide), rapidly takes the colour of the rays acting upon it, the yellow being the least marked. The red, green, and blue are, however, particularly well rendered by reflected light, and the plate shows the colours as seen when a dull light is thrown on the slit of the spectroscope, a simile which was suggested to me by Mr. Norman Lockyer.

From the evidence obtained by these experiments it appears that two or three molecular groupings are sufficient to give the necessary colours, a subject which I only allude to, since the more general question of molecular groupings is being considered by others.

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THE SUN AS A MAP-MAKER.

On this subject *Petermann's Geographische Mitthielungen* has an article in a recent number, referring to the heliogravure process, which has lately been made use of to produce the Austro-Hungarian ordance map in 715 sheets. Helio-engraving, says the above named journal, has been known and practised for years past, but it has never been employed upon so large a scale as at present in the Military Geographical Institute of Vienna. Where before the copper engraver spent five years in tedious labour, with the aid of the sun only four weeks are necessary, and, added to the saving of time, there is also a large saving of money. Hitherto the production of a map gave occupation to two persons, the draughtsman and the engraver, but by making use of heliogravure the latter becomes unnecessary. When the map draughtsman has finished his labours, the sun and a little etching acid are all that is necessary to finish the work. In a few weeks they have reproduced the drawing more faithfully than the best engraver in the world after a series of years. There is, moreover, an absence of care, worry, and anxiety.

It is true that in the case of heliogravure more depends upon the drawing; it must be sharp, and executed in the style of copper-plate. This, in fact, is the reason why heliogravure has not found so much application, map draughtsmen, as a rule, not being sufficiently schooled to the work. When it is only taken into consideration that to make a good copper-plate engraver requires something like ten years, it is rather matter for surprise that the officers of the Austrian army engaged in this geographical work should have surmounted the difficulties to be got over in heliogravure printing in from one to two years. But this period seems to have been quite necessary to accustom them to the special work to be undertaken, and render them competent to issue hundreds of beautiful maps, which replace in the most perfect manner copper-plate engraving, and render this costly art, in a word, unnecessary.

It is not only in this special branch of photography that the Geographical Institute of Vienna has distinguished itself. For many years past it has constituted itself a pioneer in photographic manipulation, and it is now many years ago that Mr. Dallmeyer was commissioned to supply the establishment with a monster lens for this very purpose of map making. Readers of the Photographic News of a dozen years ago may remember that at the time we gave in these pages an interesting account of the clever manner in which the large glasses in use at this Institute were collodionized and handled by the operators.

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WHO SHOULD EXHIBIT—PHOTOGRAPHERS OR PUBLISHERS?

A somewhat curious question is raised in some correspondence which appears in another column. It is asked if a photographer who has produced certain negatives to the order of a publisher, or, having produced them on his own account, sells them to a publisher, has a legitimate right to display prints from such negatives as his own work, at an exhibition. It will, we apprehend, occur to the minds of most of our readers that if the prints be exhibited at all, and especially in competition for honours of any kind, the producer is the only fit person to exhibit or receive such honours. It is clear that the commissioning publisher, or the purchaser of the negatives, would have no legitimate right to exhibit and compete for honours with the produce of another's skill. But the real question to be determined here, we apprehend, and in most similar cases, must depend on the nature of the bargain made. In most cases there are some qualifying conditions, the violation of which issues in misunderstandings.

In this case, so far as we understand, the correspondent, a photographer residing at Tunbridge Wells—Mr. Carl Norman—produced some negatives in accordance with the instructions of Mr. Frank Frith, a well-known photographer and publisher of photographs, and Mr. Frith also purchased sundry negatives of Mr. Norman, which that gentleman had produced by his own choice without any commission from any one. Mr. Norman, contributing to the Paris Exhibition, has sent prints from the negatives so sold, and from the negatives so produced on commission. Mr. Frith, it appears, in some way feels himself aggrieved by such contributions being sent to Paris, and communicates with the jury, stating that the photographs so exhibited are his property. It would seem, from Mr. Norman's letters, that he had the consent of Mr. Frith to their exhibition, and unless there be something behind, not stated, we should think that Mr. Frith had no ground of complaint. Mr. England, writing as juror to Mr. Norman, informs him that he has received an intimation from Mr. Frith that the photographs exhibited had been produced at his expense, and that unless some satisfactory explanation be forthcoming—or, indeed, in any case—the facts must be laid before the jury. In doing this, we can well understand that Mr. England, having received the communication in question from Mr. Frith, was simply in the course of his duty; but what difference it could make in the estimate which the jury might form of the merits of the work, we cannot see. We can understand that Mr. Frith, in making the purchase, might, for reasons of his own, prohibit exhibition of the pictures; but in the absence of such prohibition, we do not see that he could object. If the pictures were meritorious, and gained honours, no one could legitimately receive the honours but the artist producing the pictures; but the purchaser of the negative obtains also an advantage in such case, as he is owner of the negatives of the prize pictures. The case is not like that of a race-horse, where the purchaser takes the stakes the horse may win. In this case, we cannot rid ourselves of the notion that there is some point which is not disclosed in the correspondence, and that Mr. Frith feels himself aggrieved in some way which we do not at present see. Otherwise, we must confess that his position does not appear to us to be a reasonable one, nor one likely to be adopted by a gentleman who has himself had a long experience as a photographer.

If Mr. Norman had been in the employment of Mr. Frith as an operator, and claimed a right to exhibit, as his own work, some of the negatives produced by instruction in the regular course of duty, we could understand that a much more complicated case existed. It is not an uncommon thing for a workman to claim the credit of a production in which he has had a hand—perhaps the chief hand—but with the appliances, the instruction, and general superintendence of the principal of the establishment. We remember once hearing an operator claiming the production of a prize picture, he having been an unimportant assistant in the studio where it was produced, his sole connection with the picture, within our own knowledge, consisting in the fact that he had cleaned the glass, and had also aided in washing the prints. But in the case in question no such issue appears to be raised, and, if the statement of facts be complete, we apprehend that the fullest explanation to the jury will not in any way peril Mr. Norman's claim to any honours which may legitimately accrue to his exhibits.

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THE NEW CHARGE OF FADING IN CARBON PRINTS.

On another page we print a further communication on the alleged new source of fading in carbon prints, from Mr. Tunny. He also favours us with some of the examples upon which his charge is based. The whites of a print produced by the Autotype Company, partially masked and exposed to light for a month, are very much discoloured, and portions of single and double transfer paper, exposed for eighteen hours, show unmistakable traces of change. All this is in strict conformity and confirmation of what we stated in our last, the examples frankly sent to us by the Autotype Company being even more seriously deteriorated.

But, we regret to say, Mr. Tunny seems to think that we wrote in some spirit of antagonism to himself and his special discovery of this dangerous quality in some transfer papers, and defends his act in giving publicity to it as though we had impugned such a course. His consciousness of what was right to the public, and his devotion to the art, compelled, he states, the publication. We do not believe that anyone who knows Mr. Tunny will for a moment doubt his motives. We did not. We distinctly rehearsed the facts that not only was Mr. Tunny well known to the photographic community, that his name was identified with early efforts in behalf of permanent printing; that he was one of the earliest to publicly congratulate Mr. Swan on his discovery; and that he was using carbon in his professional portraiture; and that, therefore, he was one of the least likely willingly to impugn the trustworthiness of carbon. We never questioned the truthfulness of the experience stated, but, whilst endeavouring to explain its causes and nature, we gave full credit to Mr. Tunny for the valuable nature of his observations, and the need for caution they suggested.

But we, too, owe a duty to the public, and have to discharge it in a very public manner. We saw at once that there was a very dangerous suggestion in the statement of the case, the responsibility for which may or may not belong to Mr. Tunny; we do not know, and never imputed it to any one. That which was clearly a discolouration of the paper was spoken of as a deterioration of the image, and styled fading in the carbon print. On behalf of a beautiful process which is destined, we believe, to relieve photography of the fatal stigma of instability, and on behalf of many important interests, involving reputation and capital, and on behalf of the public at large, we felt it a duty to repudiate this misimputed charge of fading in carbon prints.

Mr. Tunny seems especially annoyed that we should suggest that his experience was probably exceptional. We are exceedingly sorry to have hurt Mr. Tunny in any way, or that he should fancy we wrote with any feelings inimical to himself, for whom we have, indeed, the highest esteem. Whether the experience was exceptional or common could only be ascertained, of course, by publication, and comparing notes, and in publication, therefore, he took the legitimate mode of ascertaining whether his were a common or an exceptional experience. In no case could there be any blame involved, whether the experience were exceptional or not. Nor did we dream of imputing blame or expressing slight of any kind. But we must confess that we hoped it was an exceptional experience, and we gave reasons for believing it to be so. These reasons seem to us so cogent, that we cannot help retaining the notion that the discolouration of transfer paper was not common.

We have a good collection of carbon prints as produced by Mr. Swan. Knowing our interest in the progress of permanent printing, he sent us an example of most of the good things he did. None of them have changed in any degree, although many are hung constantly exposed to light. Of the recent productions of the Autotype Company we have, as we said, less knowledge. We have, however, seen them at exhibitions and public places, with no trace of the damning change produced by this faulty transfer paper. We must still believe, and heartily hope, then, that Mr. Tunny has had the bad fortune to get hold of some exceptionally bad specimens of transfer paper.

In a private letter, Mr. Tunny makes a suggestion which we feel strongly disposed to endorse. He suggests that the yellow tint which Dr. Van Monckhoven found in some cases, and attributed to an insoluble chrome salt remaining in the print, was in reality due to the transfer paper, and not to the chrome salt at all. This is exceedingly likely. And, without talking about either big or little discoveries—a point, we may remark, upon which we never touched in our article[*]—we willingly accord the very highest credit to Mr. Tunny, who deserves much gratitude for bringing forward this question, and so arresting the danger, which not only spoiled prints, but risked subjecting that process to the stigma of instability upon which the redeemed reputation of photography so largely depends.

Critical Notices.

A POPULAR EDITION OF THE AUTOTYPE MANUAL. (Autotype Company, Rathbone Place.)

The issue of a shilling edition of the Autotype Manual, revised so as to contain all the improvements which experience to the present time has suggested, is very timely. Carbon printing is steadily progressing, and taking its position as an imperative branch of the art, which must be accepted and practised by all who wish to maintain position as trustworthy portraitists; and in the absence of personal apprenticeship to its practice, possible to very few, a really practical and simple manual is of great value. The shilling edition before us is not in any respect inferior to the former more expensive issues, but conveys complete instruction in every department. It has also a capital example of single transfer enlargement. We need scarcely say we recommend the work, as it will, on being seen, inevitably recommend itself.

THE THEATRE. A Monthly Review and Magazine. No. 1. (London: Wyman and Sons.)

Our special excuse for noticing, in these essentially photographic pages, a high-class magazine devoted to the drama, and subjects connected therewith, if excuse were needed in relation to a subject of such universal interest, is the fact that the first number contains two fine photographic portraits: the first, that of a distinguished actress and charming woman, Ellen Terry; and the second, that of a popular actor, Mr. H. Irving. They are both good as likenesses, and are admirably printed by the Woodburytype process. As pictures, both would have been improved by more concentrated lighting, a little force being lost by excess of diffused light. The magazine promises to supply a want, namely, a high-toned and interesting magazine devoted to dramatic subjects and interests.

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FRENCH CORRESPONDENCE.

Spots in Prints—Monument of Niepce—Oxgall as a Substratum.

Spots in Paper Prints.—It will be in the memory of my readers that the cause of the spots that appear on positive prints in salts of silver has lately been much discussed. In a letter just received, M. Rougeon, photographer at Brest, recurs to this subject, which is of so much importance to all who practise our art, and, as the result of his observations, gives us some practical directions that cannot fail of being received with satisfaction by all manipulators. The spots referred to are the white round ones, about the size of a pin's head, that show themselves suddenly some hours after the print has been mounted. Many persons attribute them to insufficient washing; others to the acidity of the glue or gum used; but the larger majority of photographers think that they are due to the paper. M. Rougeon disputes the correctness of all these assertions. He shows that the spots caused by insufficient washing—arising, that is to say, from the presence of sulphur—can be recognised by their olive-yellow tint; those due to the paper are, it is true, white and round like those of which we are speaking, but they make their appearance after the fixing with hyposulphite; those which should be attributed to the glue show themselves some days only after the prints are mounted, and sometimes even a much longer time after that operation. The spots to which M. Rougeon draws attention arise, as he assures us, from the acidity of the cards on which the prints are mounted. Happening to have at hand a large number of these cards of different kinds, M. Rougeon was struck by the thought of submitting them to an experiment that has enabled him not only to establish the cause of the defect in question, but also to point out a remedy for it. He took a piece of Bristol board, and cut it into strips, which he put to soak in a glass containing fifty c. c. of distilled water; into another glass he poured the same quantity of distilled water. Both glasses were then fitted with covers, and allowed to remain for some days, so as to allow the cardboard to be thoroughly penetrated by the water. At the end of that time he added some tincture of litmus to each glass, when the water in which the cardboard had been soaked at once turned red, while that in the other glass retained its blue colour. Several specimens of cards when submitted to the same experiment showed the same signs of acidity. Our correspondent, however, finds that they can still be used without injury by merely passing them through a strong solution of alkali. Since he has adopted this method his proofs have been completely free from any spotty appearance of the kind in question. We have no hesitation in drawing the attention of our readers to so simple a remedy, and in begging them to prove its efficacy for themselves.

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[*] Since writing this we find the words to which Mr. Tunny refers in the remarks of a contributor under the heading of "In and Out of the Studio." We are sorry if they seem to Mr. Tunny to be offensive.—Ed.

Monument of Niepce.—In one of my previous letters I mentioned a subscription that was being raised by the municipal body of Chalons-sur-Saône for the erection in one of the public places of that town of a monument in memory of Nicephore Niepce. The President of the Photographic Society of Vienna has recently informed the French Society of Photography that he held at the disposition of the promoters of this project the sum of two hundred francs, collected by the Society of Vienna in 1870, in aid of the widow of Nicephore, and not used for that object. This intention will be received in France with acclamation, showing, as it does, the honour in which the memory of our great compatriot is held among our foreign brethren.

The Use of Oxgall as a Substratum in the Carbon Process.—Both in the Society of Photography, as well as among photographers generally, there has lately been considerable discussion about M. Lamy's carbon tissue, and about the method for using it which he has described in his book recently published. Of all the different surfaces and substrata used as provisional supports for the development of carbon prints mentioned in that book, the author prefers, on account of its easier working, either paper coated with caoutchouc, or glass rubbed with talc, and then coated with collodion; at the same time he does not fail to point out the disadvantages attending the employment of both of these methods. The former necessitates the use of reversed negatives, if it be not desirable to sacrifice successively three sheets of prepared paper; besides which, the odour of the caoutchouc and of its solvent is most offensive; and lastly, by this method only mat proofs can be obtained, which must afterwards be varnished. Collodionized glass gives very rich and brilliant prints, but the method of obtaining them is costly; at the same time, removing from the glass all signs of grease, which is indispensable if spots are to be avoided, takes a considerable time. Cleaning and coating fifty plates of 27 by 33 c. met. take the best part of eight hours' continual work, and consume a litre of collodion.

These drawbacks have led M. Lamy to have recourse to another method, in which glass still serves as the provisional support, but in which the collodion may with advantage be replaced by a substratum which costs only a few centimes the litre, that quantity being sufficient to coat more than eight hundred plates of the dimensions given above. After simply polishing them, eight hundred and eighty plates can be coated in eight hours. The prints can, according to wish, be made either extra-brilliant, like those which we call enamelled; brilliant, as are those which are printed on double albumenized paper; or nearly mat, like those on weakly albumenized paper.

The plates, having been polished to a clean and perfectly dry surface, are coated by immersion in the following preparation:—Thirty cub. cents. of glacial acetic acid, or 100 c. c. of ordinary concentrated vinegar, are added to 500 c. c. of oxgall, when the constituents of the latter become separated. After the reaction is complete, the whole is passed through the filter; the liquid which passes through the filter is a solution of sodium acetate, while the precipitate which remains on the filter consists of the various fatty acids of the oxgall. The filter is then cut in pieces and put into a flask, or it may be washed with distilled water until the latter runs off colourless. The whole is then passed through a fresh filter, where the washing is completed, after which the animal matter is collected and treated in the second filter itself with 250 c. c. of liquid ammonia of 22° strength, which will dissolve it entirely in the cold; though if the ammonia be warmed over the water bath, the solution is easier and quicker. As the result, we have an oily green-coloured liquid. Finally, we add 250 c. c. of distilled water in which one grain of alum has been dissolved, and with this preparation the plates are coated. This substratum, when dried on the glass, possesses the property of retaining the image at the moment of the provisional transfer, and during the whole of the development with hot water. Besides which, after the permanent transfer paper has been well dried, it renders very easy the separation of the image from its new support, as well as from the glass from which it has to be removed. It ought to be added that for applying the substratum of oxgall, M. Lamy recommends that it should be poured into a horizontal pan. After the surface of the liquid has been skimmed, the plates are cleaned and dusted, and plunged one by one into the pan, which should contain just enough to moisten only the lower surface of the plate without flowing over the top. They must be taken up and dipped thus once or twice, and then placed in a rack to dry, in such a way that the air can circulate freely around them. It is needless to say that all dust must be avoided with the greatest care By this means a number of plates can be prepared in advance, and they must then be kept in a box with grooves.

Speaking of this process at the last meeting but one of the Society of Photography, our able photographer, M Liebert, remarked that as the disagreeable smell of the oxgall caused inconvenience to many persons, it might with advantage be replaced by a solution of ten grams of polishing wax in a litre of benzine. On the other hand, M. Lamy writes to us that wax which melts at about 60° C. is not so good for the purpose as the fatty acids of gall, which melt only at a temperature above 100° C. However that may be, the methods above described, emanating as they do from operators of the highest skill and experience in carbon printing, deserve the serious attention of all photographers who adopt that process.

Ernest Lacan.

SIDE-LIGHTS *V.* FOOT-LIGHTS.

“GOOSEQUILL.”

I have been waiting patiently to see if anyone had ideas on the subject of Mr. J. Champion Bradshaw's article in the last Year-Book, at page 101.

I don't like criticising, I must confess; my heart is too soft, I suppose, or the temper of my pen is too good, or my ink is not of the right sort, or—something, anyway. I had rather somebody else had undertaken the task. However, I deem the advice Mr. Bradshaw gives too revolutionary to be endorsed even by silence, so by way of reply I intend quoting against his words a paragraph from Mr. Robinson's “Pictorial Effect in Photograpny.”

First, to hear what Mr. Bradshaw says:—

“Looking over an album, a short time ago, I was struck with the portrait of an actress—a good photograph, too, in the usual style, of a beautiful dark-eyed woman; but although the features seemed very familiar to me, yet I could not remember where I had seen her before. Now this is an unusual thing with me, as it is my boast that once having seen a face I never forget it. At last I took the carte out of the album, when I soon had the desired information, as the name was at the back. I then studied the picture again, endeavouring to find out why I had not recognized it before. Suddenly I understood it. I had seen the actress lit up by her favourite foot lights. I saw her picture lit by the ordinary top or 45° light.

“Now, my friends, gentle or otherwise, I ask you, are the photographs of any of our popular actresses, operatic or theatrical, ever like the fascinating creatures with whom, we are told, our young aristocracy fall in love at first sight, ever afterwards hanging about behind the scenes until she either marries him, or gives him her C.D.V.?—when, I suppose, he becomes disenchanted. Now why not take their professional pictures with the light that suits them best—in fact, foot lights, instead of top lights?

“I am afraid you won't get those nice (?) masses o shadow (*a la* Rembrandt?) under the eyebrows and chin which you are so fond of; but, then, what do you expect? You cannot have everything, you know. Seriously, I think this, what we may call low three-quarter front light, would suit consumptive people with hollow cheeks and sunken eyes, sitters with scanty or very glossy hair, &c. Above all, I believe it would suit children. I can imagine exquisite sketchy portraits of these little angels taken in this light. I have no doubt, if well managed, it would also materially shorten the exposure. Try it.

"Now, my friends, I would willingly explain how you are to adapt your studios to this new style, but I cannot. I have not the least bit of mechanical skill; but whether by means of reflectors or what not, I feel sure you will manage it, and thank me afterwards for these suggestions on side lights and foot lights."

Mr. Robinson says:—

"It is strange that the effect of light on the face is not more studied on the stage, where facial expression is seriously interfered with by the unnatural effect of the light coming from below."

Words of comment are, of course, unnecessary. Anyone who has visited a theatre during a performance cannot fail to discern that the faces of the actors, and especially the "fascinating creatures with whom, we are told, our young aristocracy fall in love at first sight," owe none of their charms to the lighting from the foot-lights; and it is only from other lights (in the "flies" and in the "front of the house") that the hideous effect is somewhat toned down.

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RAPID SILVER PRINTING.

The *Photographisches Wochenblatt*, by request of its correspondents, repeats the details of the so-called *Light-paus* process, which, by reason of the rapidity with which it furnishes copies, is likely to become a favourite method with army photographers in the field, where it is of importance to print quickly in all sorts of weather. Our readers are already conversant with this plan of printing by development, which is employed in this country in enlarging; but the process here given of Fritz Haugk varies a little from that already published. We put it before our readers in the form it is given in the *Wochenblatt*.

The paper most suitable is that to be purchased from dealers under the name of "positive paper" in its normal condition—that is, without any photographic preparation upon it. Its preliminary treatment is effected with a solution made up of—

Iodide of potassium	5 grammes
Chloride of potassium... ...	20 "
Distilled water...	500 "

The solution is filtered and poured into a porcelain vessel. To it is then added ten grammes of the finest arrowroot flour; the whole is then warmed, the liquid being stirred the while with a glass rod, until it begins to boil. The mixture is then permitted to cool, and the skin formed upon the top is removed.

The sheets of paper are now treated with this solution. The best way is to fasten the paper upon a flat board, cementing the four corners with sealing wax. For spreading on the solution a broad camel hair brush is the most suitable, this being moved up and down and all over the surface of the sheet. To make the coating uniform, the sheet is rubbed over with a second brush, and finally the paper is hung up to dry.

In a closed portfolio paper prepared in this way may be kept for some days in a serviceable condition. If during this period it assumes a slightly reddish tone or becomes covered with marble markings, this is no reason why the paper should be thrown away, all those imperfections disappearing when the paper comes to be sensitized.

The sensitizing bath is composed of—

Distilled water	500 grammes
Nitrate of silver	40 "
Citric acid	2 5 "

After the paper has been treated upon this bath it becomes exceedingly sensitive. It must not be brought into daylight even for an instant. The placing in the pressure frame under the negative, as also the examination of the print, must invariably be undertaken in the dark room.

The action of the light is not at once apparent, although it is seen by a marked change of colour; the full effect of the printing only comes out on development with gallic acid. For this reason the exposure to light, or operation of printing, is very short, the time required being only so long as is necessary to obtain an impression of the outlines of the image. When this has been secured, the printing-frame is carried back into the dark-room and developed in the under-mentioned solution:—

Cold saturated solution of gallic acid	1 part
Distilled water	4 parts

The image floated upon this solution gradually becomes vigorous and assumes a dark brown tone. It is lifted from time to time by its corners, in order to look at it by transmitted light, and as soon as it appears sufficiently vigorous, it is dipped into cold water, so that the gallic acid may not sink into the paper. Then, if necessary, it is put into a toning solution, and finally fixed. All these operations must be conducted in the dark room.

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Correspondence.

PHOTOGRAPHERS, OR PUBLISHERS?

Dear Sir,—As photographic exhibitions are becoming more and more general, and the desire to excel which they call forth, and which is their main object, is stimulating our energies to reach the top of our profession, it may be interesting to some of your readers, as well as myself, to have the points discussed as to whom the merits of a picture are due, whether the artist who took the same, or the printer and publisher, supposing them not to be one and the same person.

As an exhibitor at the Paris Exhibition, I received a letter from Mr. England, one of the members of the jury, bearing upon this question, and as his letter, as well as my replies to the same, may be of interest to the fraternity, I enclose you copies for publication, and shall be glad to see the opinions of others on the subject.

For the sake of making myself better understood, let me take an example. Supposing Mr. Robinson had disposed of the negative of his well-known picture "When the Day's Work is Done," would he, through the transaction, lose the merits due to the picture?—I remain, dear sir, yours very truly, Carl Norman.

August 8th, 1878.

[Memorandum.]
Paris Universal Exhibition of 1878,
4th day of July, 1878.

To Mr. Carl Norman.

Dear Sir,—I have just received a letter from Mr. Frith, stating that the pictures exhibited by you are from negatives taken for him and at his expense, and also that he furnished you with the proofs. I shall be compelled to lay his letter before the jury, but before doing so should like to hear if you have any explanation which I can give them at the same time.—I remain, sir, yours faithfully,

W. England,
Member of the Jury, International Exhibition, Paris.

Graphic Villa, Tunbridge Wells, July 7th, 1878.

W. England, Esq.

Dear Sir,—Many thanks for your memorandum of 4th inst., in which you are kindly informing me that Mr. Frith has sent you a note stating that the views exhibited by me are from negatives taken for him and at his expense. In reply to the same I beg to state:

1. That the Indian views are from negatives which I have taken for him, and at his expense. 2. That the Swiss, French, and American views are from negatives which I have taken for myself, and at my own expense, but subsequently sold to Mr. Frith. 3 That the English views are from negatives which are my own property 4. That previous to my exhibiting in Philadelphia I asked Mr. Frith whether he had any objections to my exhibiting my own work, but having none whatever, I had his full permission. 5. That as the whole of the negatives are my own work, executed solely by myself, if any merits are due to them, it is certainly belonging to me as the artist and exhibitor.

Trusting that the jury will recognize this, I beg in addition to say that if Mr. Frith had any objections to my exhibiting he certainly ought to have withdrawn his permission before the Exhibition took place, and not wait until now.—I remain, dear sir, yours very truly,

Carl Norman.

Graphic Villa, Tunbridge Wells, July 8th, 1878.

W. England, Esq.

Dear Sir,—In addition to my letter of yesterday, allow me to make a few remarks respecting my exhibits. It seems to me patent that if any honour is due to my pictures, it is surely the artist of the same who is entitled to it, irrespective of the printing and publishing of the same, so much the more when the artist is the exhibitor, and not the printer or the publisher.

I trust, my dear sir, that you will kindly demonstrate this to the jury, and only see in Mr. Frith's letter an act of jealousy, which will not affect the proper judgment of the jury.

Allow me to add that the frame of English views are my own printing, as well as publishing.

Thanking you for your kindness in giving me the opportunity of explaining myself,—I remain, dear sir, yours very truly,

Carl Norman.

ANOTHER CHARGE OF FADING IN CARBON PRINTS.

Sir,—By a mere mishap, you did not, along with your contemporary, the "British," get the same evidence as to the rapid change that the ordinary transfer papers undergo when subjected to light. I now enclose one of the pictures that I subjected to light (half-obscured) for about a month in the printing room. This print is one of those spoken of that had been sent to the Autotype Company; the other was sent to the Editor of the "British." I ask you, in fairness to myself, and in justice to the interests of your readers, to state if, in the experience of thirty years, you have ever seen an albumen silver print undergo the same deterioration in the above specified time?

It matters to me little—very little—whether you may think it neither a great or grand discovery, but I am sure the photographic public will not receive the announcement in the same spirit that you have done, especially those who have their bread-winning interest wrapped up in the permanency of carbon photography. I am sure I should have been the very last to have raised a doubt, either in the minds of my professional friends, or the echo of it to have reached our patrons, the public; but certainly I would neither have been true to my own consciousness of what was right to the public, or my devotion to the art, to have kept the facts that have come under my observation from reaching the ears of those who have quite as great an interest in sending out to the world a permanent basis upon which carbon prints are to be laid, as the photographer who has to meet the public, after they have been subjected to conditions that will prove their permanency.

When you speak about my experiments having been performed upon an exceptionally bad specimen of transfer paper, allow me to say that my experiments have extended over transfer paper that has been sent into the market for the last four or five years. I also enclose withth is a specimen of a transfer paper that was sent out December, 1877, another piece March 19th, 1878. Upon examination you will see what a great change has taken place in these papers after having been subjected to the light for eighteen hours. Surely this is sufficient to prove the utter unstableness of the base upon which we have been putting down our pigment pictures.

Under ordinary circumstances I might have taken notice of your correspondent, "The Blackest of the Three Crows," but I hardly think it worth time and your valuable space to reply to one who thinks shame of the name that he inherits by birth.—Yours truly,

J. G. Tunny.

IRON SPOTS IN RIVES PAPER.

Dear Sir,—In reply to my letter in your number of July 26th, Messrs. Marion and Co. declare that Rives paper is free from iron spots. If, instead of making such a risky assertion, they had persuaded the people for whom they are agents to be more careful in the manufacture of the paper, it would have been better for manufacturers, agents, and consumers. By-the-bye, I happen to know that a party who complained to the makers at Paris was told that the spots blew into the windows when they were opened for ventilation. Of course this must have been when the shells were bursting outside the house during the bombardment by the Germans, as particles of iron at other times are not often blown into the windows of houses. It is well known that the great objection to Rives paper has always been "those darned spots."

Messrs Marion say that, practically speaking, there are no iron spots in Rives paper. I say that, practically speaking, there are about two hundred in the bit of Rives paper, cabinet size, enclosed in this letter, and, I am sorry to add, that we often have to destroy several sheets in a day, a single sheet often exhibiting thousands of these same iron spots. I now leave you to decide whether they are really iron spots in the body of the paper, or whether, as Messrs. Marion appear to hint, the poor paper has been blamed for what is really some shortcoming of the novice who has only had about a quarter of a century's experience with photographic paper.

To conclude, I would ask Messrs Marion how it is that the most clumsy and careless amateur cannot produce such spots in Saxe paper?—Yours very truly, C. Durand.

PS.—I wish to add that it is only an occasional batch that is so bad; but it is worse lately.

[The sample of paper enclosed is certainly terribly "peppered." We will forward it to Messrs. Marion and Co., who possibly may suggest another cause for the spots. If they can also suggest a cure, it will be beneficial.—Ed.]

ECLIPSE OF THE SUN.

Sir,—The gentleman who writes the interesting paragraphs in "Photography In and Out of the Studio" is wrong in one or two particulars as to the late eclipse of the sun, and I shall be glad if you will allow me to point out in what respect.

The method employed by M. Janssen to photograph details of the sun's surface would be quite useless if used to photograph the corona. A very rapid exposure—say the tenth of a second—would simply show a ring of light close up to the edge of the moon. An exposure of one-thousandth of a second, might show red flames, but I doubt if any other mark would be seen on the negative. The bright part of the corona is about equal to strong moonlight, and at 30′ distance becomes very faint, so that some seconds' exposure is necessary to secure the image.

On the occasion of M. Janssen's escape from Paris it was for the purpose of seeing an eclipse of the sun. The transit of Venus did not occur until some years afterwards.—Yours truly,

A. Brothers.

Proceedings of Societies.

Photographic Section of the American Institute.

A meeting was held on June 4th, President Newton in the chair. The minutes of last meeting were read and approved as corrected.

The Secretary said:—I received some time since a communication from Mr. Solomon, of 22, Red Lion Square, London, as follows: "I beg you will try the enclosed non-actinic cloth, as a substitute for non-actinic glass for chemical rooms. If you require a few samples for distribution, I shall be happy to forward them, &c." Here are the samples. I had then some time before I could test them. I prepared very sensitive paper, and exposed pieces to bright sunlight under the non-actinic cloth, and I exhibit the pieces so exposed here. I might say that I selected the time of exposure in the afternoon between three and half-past three o'clock, as I find that in New York City the light is strongest in actinic force at that time.

Mr. Chapman: In what position, and under what light, were those experiments tried?

The Secretary: In a south window, the bright direct sunlight not passing through glass. This piece, No. 1, was exposed three-quarters of an hour. You will see no effect of light through the cloth. This other piece of paper, No. 2, was exposed fifteen minutes.

Mr. Chapman: The thick cloth is too red. Light passing through it would, I should judge, be very trying to the eyes.

Mr. Brown: You will find canary-coloured tissue paper is the best for ordinary light; it may be used in more than one thickness, if necessary.

Mr. Mason: Mr. Bierstadt used yellow paper known as post wrapper. I hardly think the red would be so pleasant to work by, though it is effectual in stopping all, or nearly all, the actinic rays of light.

The President: In order to enable Mr. Mason to corroborate my statements in regard to emulsion and to dispel the idea, to a certain degree prevalent, that it is a fiction of mine, in some way unaccountable, I took a bottle of emulsion over to Mr. Mason's studio at Bellevue Hospital, between nine and ten o'clock, and asked him to sit me for a picture and use his bath. He did so, and sat me fifteen seconds, and produced this negative (exhibiting). I then prepared an emulsion plate, and asked him to give me a sitting with an exposure of two seconds, which he did, and the result was this negative (exhibiting). Then he tried his bath again, giving four seconds' exposure, and produced this negative (exhibiting). You will notice there is very little image seen on the last plate, except in a few parts of the high lights.

Mr. Mason: I can fully corroborate these statements. Mr. Newton came to my studio yesterday morning at half-past nine, and asked me to make a negative with a bath-plate by my ordinary working process. He told me he wished to try comparisons with his emulsion, which he had with him. I made negatives exactly as he has stated here, one in fifteen seconds, as you see here. Then he prepared a plate, the preparation being very simple, and requested me to give an exposure of two seconds. We used the same instrument, and the pictures were made one immediately after the other—the same position and conditions. The emulsion picture, as you will see, shows the greatest amount of exposure. The difference seems to be very great, and if the emulsion can be made successfully—and I have no reason to suppose the contrary—I shall certainly adopt it, as a great deal of my work—being upon people who are in pain—necessitates short exposures; and if I can get a picture in two seconds which now requires fifteen seconds, it will be a great improvement. And it is certainly as simple, and in many respects for my work it will be more simple, from the fact that I can keep the emulsion plate ready prepared, which is also an important point. I must say that this demonstration, coupled with others which I have made myself, and which I have seen Mr. Newton make, has convinced me that emulsion really is a vast step in advance of anything we have ever before had. The only question which arose in my mind was in regard to the stability of emulsion, from the fact of its being a compound made out of the usual order of our work, and requiring careful manipulation in its production. I see no reason why, under Mr. Newton's method, the wide-awake photographer should not be able to compound an emulsion with as great certainty of its working as he would find in the manufacture of collodion. Of course there are some compounds used in the making of emulsions which are simple, but not well known to the majority of photographers.

Mr. Chapman: There is no question in my mind about the emulsion; I have had experience enough in that matter to assure me of its great value. But I have never used it in my special work, because it is of such a character that you cannot see the image when you are developing. In my case there is nothing to be seen by the unaided eye.

Mr. Newton: With the emulsion as I now make and develop it, the image is as distinct by reflected light while developing as the image on a bath-plate. It is, in fact, more brilliant and distinct as a positive than by any other process with which I am acquainted.

Mr. Chapman: That is exactly what is wanted. Previously there were no means of determining when to stop the development, from the fact that by the processes which I have worked the image was nearly invisible, except by transmitted light. As to solar work, there was plenty of light. I did not require a quick process, because we have light enough; but with lunar and stellar work it is different: there are times when it is of the greatest importance to have rapidity. The only trouble I have had with emulsion has been in the preservatives. Emulsion dry plates, when developed within a few days after exposure, in my case have been exceedingly fine and good, and as quick—not as quick as desirable, but then it was within a reasonable time of exposure, twenty, thirty, or forty seconds' time; this was outdoor work. But after the plates remained from four to eight weeks after exposure, in every case it was almost impossible to bring out a vigorous picture with the alkaline developer. I could save the plates, however, by simply bringing out a very light outline of the image with the alkaline developer, and then complete the process by the use of acid pyro. and silver. Since then I have learned that by adding gallic acid to the preservative, those plates will keep after exposure. I think I may go out on the Eclipse Expedition, and in that class of work we are going to attempt a new order of things. The attempt is to be made to photograph the spectrum of the corona of the sun while in a total eclipse. We were once very well satisfied to get the picture of the corona; but now they are going to stretch that out and separate it into its different wave-lengths, and photograph the different portions of it, and for this reason it is a matter of the greatest importance to have the utmost sensitiveness. Some experiments have been tried on photographing the spectrum from the moon, to see how weak a light may be photographed. If this bath of Mr. Mason's was as good as the ordinary baths that photographers use—and I have no doubt it was—his experience in this matter, of course, none of us doubt—here are two negatives, one made in fifteen seconds, the other in two seconds, one-seventh of the time, and showing at least double the exposure, or effect of light, as nearly as I can estimate, which amounts to a sensitiveness equivalent to about fifteen times greater. It seems that one second with the emulsion would give as much detail as the fifteen did on the bath picture; and this emulsion of Mr. Newton's, I understand, is of a permanent sensitiveness, which will continue as long as the material lasts.

Mr. Newton: Perhaps I have one hundred different samples, all labelled and dated. I recently found a sample of April 6th, 1876, two years old last April, and tried it; it worked as fine as any emulsion you ever saw, though it was not so sensitive as some made by my recent formula.

Mr. Mason: In regard to any special manipulation about this emulsion work I have seen nothing difficult. Of course, Mr. Newton developed the emulsion plate here shown. But he was not very particular with the material, using that which was in my place without any special proportion. There was nothing further in the manipulation than what he has told you, except that he brought with him what he calls his accelerator, that he will probably give you to-night.

Mr. Newton: I spoke of the way in which this extreme sensitiveness is produced at one of our meetings in the winter, February or March. The plates are flowed before exposure with a modified alkaline developer. I experimented to get the minimum amount of bromide in this modified accelerating solution. The compound I now use for this purpose is as follows: water, 12 ounces; carbonate of soda, 180 grains—that is, fifteen grains to the ounce, and two grains of bromide of ammonia to the twelve ounces. That is a homœopathic dose, but it is effectual. If you use the soda solution without that small quantity of bromide, your plate will be fogged after exposure, that is, it will fog all over during exposure; but two grains of bromide is sufficient to restrain all tendency to fog, and you get all the advantage of the alkaline condition without any unnecessary restraining action. This accelerator increases the sensitiveness of any wet emulsion plate from four to six fold.

Mr. Chapman: You mix your developer for each plate?

Mr. Newton: No; I take six ounces of carbonate of soda and dissolve it in a quart of warm water. That is a stock solution. Now take an ounce of this and add bromide of ammonium, ten or twelve grains, and four ounces of water. When the bromide of ammonia is added to the soda solution there will be a strong smell of ammonia, by the liberation of ammonia when the carbonate of ammonia is formed. When I develope a plate, I take enough of this solution to flow it, and no more. Perhaps I ought to say something in reference to the ferrous-oxalate developer. It is not quite clear in the minutes. The ordinary way of making the ferrous neutral oxalate of potash had been by making two separate solutions of the potash and oxalic acid, and putting them together; but in simplifying it, I merely made a solution of the potash and added the oxalic acid in crystals, to save one operation. I think I stated that I used all the way from five to thirty-five grains of the protosulphate of iron to determine about the best quantity, and found fifteen to twenty grains to the ounce of oxalate of potash solution was sufficient. It dissolves very quickly, and forms a ferrous oxalate, which turns the solution a deep orange colour. I have further simplified the manufacture of the oxalate developer by making it acid by a slight excess of oxalic acid at the time of compounding. This obviates the necessity of any further manipulation for acidifying. When the solution is so prepared, it is only necessary to add the iron as before stated, and the developer is ready for use. Prepared in this way I obtained all the intensity desired.

Mr. CHAPMAN: Would you recommend the use of this ferrous-oxalate developer instead of the alkaline developer?

Mr. NEWTON: My experience with the developer has been so limited that I cannot well give a decisive answer to the question. It produces no fog, and you can use it repeatedly; that is a great advantage. It gives very fine detail in all the weaker lights that is very difficult to get by any photographic process, and not have the high lights overdone before you have the shadows done enough. From my experience up to this time I feel justified in saying that it promises to be the developer of the future for emulsion plates.

Mr. CHAPMAN: I am much encouraged now by seeing these negatives; I think this is going to be the direction to work in.

A motion was put and carried that the President and Secretary be authorized to prepare the minutes at this meeting for publication.

Talk in the Studio.

INSTANTANEOUS EXPOSURE BY ELECTRICITY.—We have been favoured by Mr. Cussons, of Southport, with a sight of a new instantaneous shutter, which is singularly rapid, and well under the control of the operator. It involves one of the most simple and ingenious applications of electricity we have met with. A small permanent battery is placed underneath the top of the camera stand to supply the force. Connected with it is the shutter inside the camera. It is not a flap shutter, which might cause dust, but a disc revolving edge-rise. A conductor of any length the operator may choose is attached to the instrument, the other end being in the operator's hand, and gives him complete control over the closing and opening of the shutter, no matter at what part of the studio he may be. It is not necessary to describe the working of the apparatus, beyond remarking that it is exceedingly simple, the opening being effected by pressing a button in the operator's hand, as an electric bell is rung by pressing a button fixed against the wall. This ingenious and very efficient contrivance is the invention, we believe, of Mr. Cowen, of Porchester Terrace, celebrated for his fine work in the powder carbon process. Every experienced operator knows the advantage of being able to expose at the right moment without going near the camera to distract attention of grown sitters often as much as babies; and this shutter affords facility for doing this.

To Correspondents.

FRITZ.—It is impossible to say what is the best colour to stop holes or scratches in negatives, without seeing the negatives, as they vary in colour. You can only watch the tint by examining and trying two or three; probably a mixture of neutral tint and sepia, or a mixture of either with Indian ink, will answer Yellow is a dangerous colour for stopping holes, as it is almost sure to print a white spot. 2. It much depends upon the fixing solution used as to whether the negative will be injured by prolonged application. Cyanide solution, if used for fixing, must be washed off the moment fixing is completed, or the half tones will suffer. With hyposulphite of soda no such risk exists; it will not injure the negative if left a few minutes after fixation is completed.

ENQUIRER.—The dirty brownish-yellow stain on your print is due to imperfect fixation. The first contact between a silver salt and hyposulphite of soda forms hyposulphite of silver, an insoluble and unstable salt, colourless at first, but nearly discolouring when submitted to light, assuming a dirty yellow tint, like that in the print forwarded. When the process of fixing is properly conducted, the hyposulphite of silver first formed is brought into contact with fresh hyposulphite of soda solution, in which it is soluble, and so removed from the print; but if, from a variety of possible causes, it does not come into contact with fresh hypo solution, it remains in the print, which becomes stained, either whilst in the washing water, or on mounting, or soon after. When the hypo bath is old and exhausted from too much use, or when it is too weak, imperfect fixing is the result. A very common cause of imperfect fixation, even when the bath is in proper condition, is the prints sticking together, so that the fixing solution does not get proper access to them. This has apparently been the case with the print forwarded. It has stuck fast to another print in the hypo bath, and the other print is probably stained in precisely a similar manner. It is important to look to this, and to keep the prints moving whilst in the fixing bath, lifting each one separately to remove air-bubbles, which sometimes stick to the print, and cause stains, and to prevent sticking.

A. WARD.—Thanks for the intimation. It would have added to the interest if you had sent a small example.

F. L. C.—It is possible to obtain carbon prints in half-tone without transfer. The late Mr. Blair, of Perth, devised several methods. One plan, which is simple and practical, consists in making the paper forming the back of the tissue transparent by means of benzole, and printing with the back of the tissue in contact with the negative, whilst the paper remains transparent. Then develop in the usual manner. The transparency will disappear, of course, as soon as the benzole evaporates. 2. Fargier was the first to work out a definite process of exposing at one side of the sensitive film, and developing at the other. His plan was to coat glass with the sensitive gelatine mixture, and expose, the film in contact with the negative. In order to get at the reverse side of the film for development, he coated it with collodion, then placed the glass in a dish of water. The film left the glass, and development commenced at once on the side which had been in contact with the glass, the other side being protected by collodion. Some good results were produced by the process, but it was difficult to work, and never came into practical use. The process was patented in this country, but the time has expired. 3. Pouncey's last process with bitumen never came into general use. M. Poitevin was, beyond a question, the first to publish a practical carbon process.

R. KISCH.—Thanks. We shall at all times be pleased to hear any details of the progress of photography in South Africa. The specimens mentioned in your note have not yet arrived. We shall have pleasure in acknowledging them in a future number.

D. D. (Belgian Subscriber).—The process of lacquering brass-work consists in applying a hard spirit varnish, generally consisting of shellac in alcohol, to which has been added some colouring matter—such as dragon's blood, or gamboge, according to the colour required. The brass is made hot before it is applied. 2. We do not know the precise formula of any special manufacturer. 3. We have no means of judging whether Boissonas' process is worth the money charged, or whether the promised rapidity is gained by those who purchase the process. As yet it has not been introduced into this country. We see, from accounts in the American journals, that the majority succeed, and a few fail. The conclusion which this suggests to our mind is that failure rests with the operator. If A succeeds with a certain formula and method of working, and B fails with the same, we are bound to conclude that the failure arises from some shortcoming on the part of B, and not from any fault of the process or materials.

J. H. FITZGIBBON (St. Louis).—We have not received the last two or three copies of the *Practical Photographer*, for which we are sorry, as it always interests us, and often helps us to interest our readers. Please favour us with attention, friend Fitzgibbon!

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. A. THOMAS, Gloucester,
Photograph of Marble Font in Glo'ster Cathedral.
Mr. GEORGE CHURCHILL, Eastbourne,
Three Photographs, groups of Prince Waldemar and three Princesses of Prussia.
Messrs. MARSH BROS., Henley-on-Thames,
Photograph of Mr. G. W. Lee.
Photographic group, Messrs. Nadeau Bros., W. H. Durrell, and S. Dusseau.
Mr. GANNAN, Ramsgate,
Photograph of Oval Design for Picture Border.
Mr. J. EASTHAM, Manchester,
Photograph of Pope Leo XIII.
Ditto and Court.

The Photographic News, August 23, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Approaching Exhibition: Its Advantages and Claims for Support.

A month from to-day photographers, who are desirous of exhibiting at the next Photographic Exhibition, must have their pictures ready framed and glazed, and, moreover, labelled in accordance with the new regulations. The date for sending in is the 28th September, and, as those who exhibited last year know very well, the timely arrival of pictures is imperative to secure hanging at all. Last year a very large number of photographs were not seen on the walls at all, from the circumstance that the Hanging Committee had more than they could do with, and the consequence was that a selection had to be made. Under the circumstances, of course, no leniency could be shown towards late-comers; and with the exception, we believe, of some foreign contributors, who were hardly responsible for the delay of their pictures, one and all of the photographs sent after time were rejected. Not only this, but in the case of nearly every photographer who had sent more than half-a-dozen large works, a proportion was shut out, and the Council-room, on the opening day of the Exhibition, contained some two hundred frames for which no space was available in the handsome room upstairs. Of course, the question naturally occurs to intending exhibitors whether this preparing of pictures for exhibition is really worth the cost and trouble naturally involved. The framing of half-a-dozen photographs, and the carriage of them, irrespective of risk of damage (which was unusually great on the last occasion), is a matter for serious consideration, and many may well hesitate before coming to the conclusion that one does well to contribute to the annual show of the Photographic Society. The chance of gaining a medal is not much of an inducement. The gaining of such a distinction is sure to bring as much unpleasantness as joy to the recipient. A medallist is certainly not made the happier by his good fortune; and if he is not a philosopher, the stroke of luck may spoil his temper in the case of all future exhibitions. Neither is there much chance of his obtaining a special notice in the *Thunderer*, or *Jupiter Junior*, unless his work happens to strike the critic for some reason or other during his brief look round; but even if he gets neither reward, nor honourable mention, it is still worth his while to exhibit, a photographer, whether professional or amateur, must in the end admit. In the first place, he never has such a favourable opportunity of comparing his work with that of other people. He has not from one year's end to another, a better chance of learning something of what he can do, and how far ahead, or behind him, his brethren actually are. Besides, he gets the judgment of others on his own work, and on that of others, and whether this is gratifying or the reverse, he can hardly fail to learn something by it. A man takes but little pride in his work, if he does not desire to see himself represented among his brethren from time to time. If he is but an amateur, he gains a great deal by showing his pictures. The difference in detail, in tone, and in the management of his pictures, whether they are better or worse than the majority on the walls is at once apparent in an exhibition of this kind, and the exhibitor has at once the satisfaction of knowing his calibre as a disciple of the camera. There is a good deal of satisfaction in being able to gauge one's own merits, and this any one may do by sending his pictures to the Pall Mall gathering. Again, there are few artists who like producing pictures which are rarely seen, any more than there are authors who write simply for the purpose of putting their manuscripts away in a box afterwards, and there is no better opportunity of displaying one's abilities as a photographer than at the Photographic Society's Exhibition. On the occasion of last year's athering, the number of visitors was altogether unprecedented, and daily hundreds of people might be seen inspecting the gallery till dusk. The mere fact that upwards of two hundred pounds was taken in cash from visitors proves the deep interest which Londoners feel in such a sight, for it must be remembered that those who pay for entrance are quite outsiders. All who exhibit have free passes for themselves and friends, press tickets are everywhere rife, and every member of the Photographic Society can issue also tickets at his own residence. The number on the free list is therefore particularly large, and there are few photographers who do not know a member of the Photographic Society, or have not interest enough with a mutual friend to procure admission. Out of the paying public there are but few photographers, and for this reason we may regard the former, who numbered on the last occasion between four or five thousand, as bona fide spectators curious to see the photographic exhibition as they would any other London show. Thus, exhibitors have the satisfaction of knowing that not only those interested in photography see their pictures, but that the general public also, in large numbers, view the productions. The London press, as we have said, take more or less notice of the gathering, and eligible visitors, from Their Royal Highnesses the Prince and Princess of Wales downwards, show interest in the works. Again, another feature, which to the professional photographer is very important, may be pointed out in regard to the exhibition, a feature, which, by reason of the great increase of visitor last year, was very marked. The sales effected through the exhibition of pictures were in some instances very large. In one instance, we are informed, several hundred pounds have been taken in the sale of copies of one of the best pictures of the year, and the fortunate owner is sanguine about making a thousand by it and a companion production. This is surely good news, but it is by no means without precedent, for another gentleman, long known as an exhibitor, has several times effected the sale of a hundred copies of large composition pictures shortly after his work was exhibited. As time goes on, we hope the annual Photographic Exhibition will become still more popular, and, if we can make advances on last year, the benefit to photographers at large will be very great indeed. In the meantime, we would urge one matter for their consideration. While every care and consideration should be given to exhibitors and their works, and means taken to reduce risk of damage done in re-packing, those who send their works to Pall Mall must not fall into the error that what they are doing is for the sake of the Exhibition and the Society, and not in any way for their own. This is certainly the idea shared by many, who take considerable credit to themselves for sending in their pictures for the good of the Exhibition. It is for their own good too, they must remember, for, as we have striven to show there are some very marked advantages which exhibitors now enjoy. The Photographic Society, no doubt, is anxious for all the support it can get, but it is a grave mistake to suppose that the benefits are all one side, and that contributors to its exhibition are simply philanthropists.

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A NEW PROCESS OF PHOTO-CHEMICAL PRINTING IN METALLIC PLATINUM.

BY W. WILLIS, JUN.*

It is a fact known to chemists that metallic platinum in all its states, massive and molecular, is totally unchanged or unaltered by atmospheric influences. It is also well known that platinum, in a finely divided state, has an intensely black colour. Now, if a picture be produced on paper or other suitable substance, in which the dark portions and shades are formed by this black finely-divided metal, it is evident, so far as this metallic pigment itself is concerned, that the picture is perfectly permanent and unalterable. The object of this process is to produce pictures in which this result is obtained.

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* Read before the British Association, Section B.

The chemical reaction upon which the platinotype process is based, is one discovered by the writer some years ago. He found that a hot solution of ferrous oxalate in potassic oxalate instantly reduces platinum to the metallic state from its chlorides and other salts.

Now ferrous oxalate is produced by the action of light upon ferric oxalate. If, then, paper be coated with the latter salt, and exposed to light, the coating will be changed by actinic action to one of ferrous oxalate. If a photographic negative be superimposed previous to this exposure to light, an image of ferrous oxalate will be produced, corresponding to those more transparent parts of the negative through which the light has more readily passed.

If a salt of platinum be mixed with the ferric oxalate, with which the paper is coated, and the paper be then exposed to light under a negative, the image on the paper will be composed of ferrous oxalate, the particles of which lie side by side, and are intimately mixed with those of the platinum salt. This image of ferrous oxalate is soluble in potassic oxalate; but we have previously learnt that a solution of ferrous oxalate in potassic oxalate instantly reduces platinum salts. If, therefore, this image be floated on a solution of potassic oxalate, we shall expect that at the moment it is dissolved the solution thus formed will reduce the platinum salt with which it is intimately in contact. This is what in reality occurs; the ferrous oxalate is dissolved away, leaving in its place finely-divided metallic platinum. Strange to say, this reduction takes place so instantaneously that not a particle of metal is removed from its position in the picture, but is left entangled in and amongst the matted fibres of the paper.

When working this process on a large scale, the paper on which the prints were to be made received a coating of a weak solution of a silver salt previous to its treatment with the iron and platinum salts. This silver salt, in some way, caused the platinum, reduced by the ferrous oxalate, to be deposited in a very finely-divided state. If the paper had no preliminary coating of silver salt, the platinum was always deposited in a roughly granular form, and did not well adhere to the paper.

Recent improvements have proved that the preliminary coating of silver salt is unnecessary, and may be altogether dispensed with, if to the bath of potassic oxalate, on which the prints are floated after exposure to light, an addition of a platinum salt be made.

The remarkably simple form the process now takes may be briefly indicated as follows:—Paper is coated with a mixture of aqueous solutions of ferric oxalate and potassic chloro-platinite, then dried and exposed to light under a negative. After it has had a sufficient exposure, it is floated on a hot aqueous solution containing potassic oxalate and a salt of platinum. This solution instantly developes the picture, which is then washed in one or two solutions to remove the chemical salts adhering to the paper. When dried, the print is finished.

This printing process derives considerable interest from the fact that it is the first in which platinum in the metallic state has been made use of as a pigment, and that it is the first photo-chemical process giving permanent results, of any particular value, in which the particles of pigment forming the picture are imbedded in, and entangled among, the fibres of the paper on which they are printed, and do not depend for their adhesion on the use of any sizing material.

The application to be made of this process embrace all those to which photographic printing is at present adapted. The pure black colour of the images or pictures, their absolute permanence, and the important fact that the pigment forming them penetrates the paper, render the process peculiarly adapted for the permanent reproduction of important documents, archæological records, medical, geological, and other scientific phenomena; for illustrating the results of military, naval, and engineering operations, and for the illustration of high-class books.

ON PROCESSES OF MAP-PRODUCTION BY PHOTOGRAPHY.

BY CAPTAIN J. WATERHOUSE.

(*Assistant Surveyor-General of India.*)

On leaving India little more than a month ago, on very short leave, I was quite uncertain whether I should be able to attend the meeting of this Association, and was quite unprepared for the honour of addressing the Geographical Section. The officers of the Section have, however, assured me that the subject, which I have made a special study for several years past, would be of interest, as inquiries were constantly being made requiring the various photographic processes by which maps are now being produced.

To explain so technical a subject properly, and make it interesting, the paper should have been illustrated by specimens showing the several processes in their various stages, and I greatly regret that I have come from India unprovided with these, and have been unable to supply the want in the short time I have been in England. Mr. Coles, map curator of the Royal Geographical Society, has, however, very kindly selected for me a few specimens from the collections of the Royal Geographical Society, and I trust that any shortcomings in this respect may, under the circumstances, be excused. I shall endeavour to make the working of the processes as clear as I possibly can.

The ordinary processes for the production of maps are, as is well known, lithography and engraving; the latter being used in preference for maps of a permanent or standard character, in order to have the means of preserving the plates in a convenient form for subsequent correction and multiplication by electrotype or transfer to stone, in order to save the wear and tear of printing from the original plates.

Both engraving and lithography, however, require the entire copying by hand of any given subject which, in most cases, demands a considerable expenditure of time and of skilled manual and artistic labour, and consequently these methods are comparatively slow and expensive.

The attention of cartographers was very soon drawn to the advantages that might be gained by the employment of photography for the reproduction of maps and plans; but for some time progress in this direction was hindered by the difficulty of obtaining accurate images, free from the distortions caused by imperfect construction of the photographic lenses and processes then employed.

Of late years, however, great improvements have been made in these respects, and photography has been largely utilized by cartographers in the production of maps by processes analogous to the ordinary processes of lithography and engraving, but vastly cheaper and quicker; and most civilised states now possess special photographic establishments for the reproduction of maps, plans, &c., for fiscal, building, and other purposes.

It is to the credit of our country that the first attempt to use photography practically in the reproduction of maps was made in 1855, by the late Colonel Sir Henry James, R.E., Director of the Ordnance Survey of Great Britain and Ireland, with the view of obtaining accurate reductions from the large scale surveys more expeditiously and with more economy than could be done with the pentagraph. These first attempts proved incontestibly the great value of photography for the purpose, and the enormous saving in time and money that would be effected by its use.

For some time, however, the use of photography at the Ordnance Survey Office was limited to obtaining accurate reduced prints for the engravers to trace from on to the copper plates; but in 1859-60 experiments made in carbon processes, with the object of finding a method of transferring the photographic image at once to the copper plate, led to the introduction of the process of photo-zincography, which has since been so largely and successfully utilized at Southampton in the reproduction of the *Doomsday Book*, and other national records, and which, since its adoption in the three Presidencies of India, has rendered possible the early publication of vast numbers of maps that could not possibly have been dealt with by the ordinary methods of lithography and engraving.

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* Read before the British Association, Section E.

By a curious coincidence it happened that at the very time the Southampton process was being perfected, Mr. Osborne, of Melbourne, Australia, introduced quite independently an almost identically similar process of photolithography, which has since been very successfully and largely used in the Australian Colonies, Germany, and America. These two processes are worthy of special notice as being the first employed in a practical way for the reproduction and multiplication of maps for publication. They are still largely used, and possess advantages in some respects, especially for large work, over other processes of the same kind which give, perhaps, finer results within the limits of a single negative.

In India the ever-increasing wants in the way of communication by rail, road, or river, and the rapid extension of irrigation, and other engineering projects, as well as the ordinary military administrative and fiscal requirements, make the early publication of the results of the surveys a matter of very great necessity and importance; and, as skilled lithographic draughtsmen and engravers have to be trained as required and brought from Europe at great risk and expense, the subject of photography as a means of quickly producing and publishing copies of the original maps of the surveys, is much more important there than it is in other countries where skilled castographic lithographers and engravers are comparatively numerous.

The success of the introduction of photography into the Ordnance Survey Office at Southampton led to its early adoption in India; and in 1862 some sappers trained at Southampton were sent out to Calcutta, where a photographic office was established in connection with the Surveyor-General's Office for the reproduction of maps and plans of the Topographical and Revenue Surveys, as well as miscellaneous maps and other subjects for the Survey and other government departments, among which may be particularly mentioned the charts of the Marine Surveys, of which some specimens are on the table.

Photographic offices have also been established at Dehra Doon in connection with the Great Trigonometrical Survey, and at Madras and Bombay for the publication of maps of the Revenue Surveys and Settlement Surveys of those Presidencies, and other miscellaneous work. In all these offices the Southampton process is used, with various modifications required by the climate.

In India the principal publishing office for all general and standard maps of the country is the Surveyor General's Office, Calcutta, and here the advantages of photography have been most marked. By its aid the publishing branches are able to keep pace with the progress of the Surveys so closely that, as a rule, each season's mappings of the Topographical and some of the Revenue Surveys is produced, and in the hands of the public before the following season's maps have been taken in hand. An immense amount of work is thus done, both for the reproduction of the ordinary survey maps, and of large numbers of miscellaneous maps and drawings for other departments, that it would have been impossible to cope with lithography and engraving alone. As a rule, the photo-zincographic maps are somewhat coarse, but they well answer all practical requirements.

The following figures will give an idea of the large extent to which photography is now being used in India:—In the Surveyor-General's Office, Calcutta, during the year 1877, 3,038 sections or subjects were received for reproduction. From these 5,343 negatives and 5,398 photographic transfer prints were taken, representing about 21,000 square feet of glass, and 22,000 square feet of paper respectively. Of these sections 2,725 were transferred to zinc, and 244,593 sheets were printed off. The greater part of this large out-turn was composed of maps of the Cadastral Surveys of the North Western Provinces on the large scale of sixteen inches equal one mile, and we are now arranging to turn out regularly between 4,000 and 5,000 of these maps yearly.

At Debra Din, a much smaller office, the out-turn in 1876-77 was 117 maps and 30 triangulation charts photographed, and 25,259 copies printed off, besides blue prints and silver prints for the use of the engravers.

At Poona 1,798 maps were photographed from 2,745 negatives, and the number of copies printed off (including copies of 79 lithographs) was 74,739. For Madras I have no returns.

Following the example of the English Ordnance Survey photography has been introduced, and largely used in various foreign countries for the reproduction and publication of the state maps.

Thus, in Belgium, a process of photo-lithography is used for reproducing the topographical maps on the scale of $\frac{1}{20000}$. In Austria a process of photographic engraving, called "heliogravure," has been introduced with very great success, and is applied to the practical production of maps and other subjects. In France, Germany, Italy, Portugal, and, I believe, other European States, various processes of photo-lithography and photo-engraving are in use, though not to a very large extent.

In America and Japan the same processes appear to be worked very successfully for Government purposes by a commercial company, of whose work some specimens are on the table.

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THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

BY THOMAS BOLAS, F.C.S.

Lecture V.

Collotypic Printing.

You have already seen how extended is the use of bichromated gelatine in photo-mechanical printing processes, and we now have to study a method in which the gelatine itself is used as a printing surface.

The bare principles of collotypic printing are as follows:—A plate of glass, or metal, is coated with a uniform layer of bichromated gelatine, and this is exposed to light under a negative. Certain parts become insoluble by the action of light, others remain soluble and capable of absorbing water. The plate is damped, and a roller, charged with fatty ink, is passed over it. Those parts which received the water refuse the ink; and a piece of paper being laid on and pressure applied, the ink sets off on the paper, forming a print. But more than this is true, as we have an infinite number of grades between the two extremes of water-taking parts, and of ink-taking parts; those parts which had a slight exposure to light being capable of receiving both ink and water, the proportion in which each is received depending on the extent to which the part has been acted on by light. Here is a damp collotype plate; I hold it up to the light, and those who are near can see a very feeble image. I now pass the inking-roller over it a few times, and the fatty ink adheres to those parts which have been exposed to light, the amount of ink being proportionate to the extent to which the light has acted; so that a picture is built up with all its gradations of light and shade. I hold up the inked plate before the light, and you see the image distinctly. I will now hand round the inked plate, together with a similar, but un-inked plate. Here is one more plate, which I take from this dish of water; this I will ink, and take an impression from it on paper. Here they are, you see. If you hand them round, you can compare the plate with the proof printed from it, The first step in preparing the collotypic plate is to take two pieces of plate-glass, such as I have here, to put some water and flour emery on one of them, then to grind them together until the rubbing surfaces are uniformly depolished. It is not worth while for me to go on grinding these until they are finished; but here are some finished ones which you can examine. When the plates have been sufficiently ground, they must be well rinsed, and reared up against a shelf to dry. The next thing is to prepare a mixture of seven parts of albumen, three parts of commercial water-glass solution, and ten parts of water. This mixture being made, it is churned to a froth by one of these American egg-beaters. You see it only takes about two minutes to convert the whole into a froth. I now pour this froth on a paper filter, and as it breaks up it runs through. This solution is now ready to pour on the plates, and you see that it runs easily over. I now let it drain off at one corner, and allow the plate to dry in an inclined position. When dry, the plate is well rinsed in water, in order to remove all soluble matter, and is again reared up to dry. In this state the plate is covered with an extremely thin, whitish film, which causes adhesion between the plate and the gelatine coating which is next applied. The sensitive gelatinous mixture is prepared by dissolving six parts of gelatine in forty-eight parts of water, and adding one part of ammonium bichromate, and forty-eight parts of alcohol. The mixture is then strained through fine muslin, and is ready for use.

Here is a metal hot-plate, made double, and in the inter-space water is kept boiling. Three levelling-screws support one of the prepared glass plates, about an inch from from the surface of the metal hot-plate. The glass plate usually reaches a temperature of about 50° C. under these circumstances; and when this is the case, and the plate is quite level, all is ready for coating it with the sensitive gelatine. I now pour on the middle of the plate as much of the sensitive mixture as it will conveniently hold, and you see that it runs well over the plate, even up to the corners. I now lift up the plate quickly, drain off the excess of gelatinous mixture, give the plate a rocking motion, and put it back on the levelling-screws in its old position. In about ten minutes it will be dry, and ready for exposure in the printing-frame, and this exposure is about equal to that which would be required to make a silver print from the same negative; but a plate which has been dried quickly, requires a longer exposure than one which has been dried slowly.

Mr. Debus is now holding a dried plate against the lime light, and you merely see an even yellow tint, arising from the uniform film of bichromated gelatine. He will now hold up a similar plate which has been exposed under a negative, and you see a faint brownish image, showing all details and shades of the original. After having printed the plate under the negative, the next step is to soak the plate in cold water, in order to remove the free bichromate; and during this soaking the image becomes much fainter, as you will see when I hold this soaked plate before the lime light. During this soaking in water, another change, and a remarkable one, takes place; all the exposed parts of the plate become puckered up into a multitude of little folds, which wind about in a very peculiar manner. These folds may be traced almost all over the picture, their depth being greatest on those parts which have been most exposed—at least, up to a certain limit, beyond which increased exposure tends to destroy the folds. The pitch of these folds may vary from about fifty to three hundred to a linear inch, and this pitch varies according to the treatment of the plate, the kind of gelatine used, the condition of the bichromate, the length of time which the sensitive mixture is kept before use, the rapidity of drying, and other circumstances. This puckering, reticulation, or grain has much to do with the printing qualities of the plate: one with a coarse grain being easier to print from than one with a fine grain; but the results are, in general, not so good. When the plate has been soaked in water sufficiently long to remove the excess of bichromate, and to develop the grain, it is taken out, and allowed to dry spontaneously. The dry plate may then be kept without injury for several days, or weeks—or even months. It should be kept in a dry, cool room, and, as a rule, ought not to be put away in a brightly-lighted place.

We now pass on to the inking of the plate, and its treatment in the press. Before use the plate should be soaked in water, in order to saturate the soluble portions of the gelatine with this fluid, and generally five or ten minutes are sufficient for this purpose. It is usual to employ the ordinary lithographic roller, and ordinary lithographic inks, for collotypic printing, and when a lithographic roller is in really first-rate condition, it answers admirably; but a new lithographic roller can only be got into a sufficiently good condition by daily exercise for about a month, and the least carelessness, the drying of ink on it, or a cessation of work for a few days, will degrade it from the state of a roller suitable for collotypic work to that of an ordinary roller suitable for lithography.

Here is a form of roller which I have devised, and have found to answer admirably, as it is always ready for use. It consists of an outer cylinder of red india-rubber, made smooth on the outside by means of fine glass paper; inside this is a thickness of about three-quarters of an inch of typographic roller composition (glue and treacle), and inside all a wooden core provided with handles. To make this kind of roller, I put the india-rubber cylinder inside this brass mould, place the core in position, and pour in a little of this glue-and-treacle composition—just enough to seal the joint at the bottom, and when this has set, I will fill the space with the glue-and-treacle mixture. When a roller of this kind is done with, the ink can be cleaned off by means of a rag moistened with a little oil of turpentine, care being taken not to use too much. The roller is then ready to be put away, and can be brought into use again at a moment's notice.

The labour of mixing stiff inks and colours, and of getting an even film on the inking slab, is considerable; but I have found that the following plan obviates all difficulty on this score. The ink is mixed up with oil of turpentine to the consistency of cream, and the colour may be modified by the addition of the artists' oil colours which are sold in tubes. In this way a thorough mixing of the colours is ensured, and when it is intended to use a portion, a piece of muslin is tied over the mouth of the bottle containing the colour, the bottle is then inverted, and the muslin-covered neck is rubbed over the inking slab. The ink thus filtered out is spread evenly by means of an ordinary typographic ink roller, and is then allowed to remain a few minutes, in order that the turpentine may evaporate. Thus is obtained a layer of ink, free from lumps, well mixed, and evenly spread. The collotypic plate being now taken from the water, is laid on the bed of the press (this having been previously covered with a sheet of white paper), and is gently wiped with a soft piece of muslin. The inking roller being charged with ink from the slab, is gently rolled, backwards and forwards, as I am now rolling, it being borne in mind that a slow rolling with heavy pressure tends to put much ink on the plate, and quick rolling with light pressure tends to take off an excess of ink. It is advisable to be provided with two inks, one rather thinner than the other, as the half tones sometimes require a thin ink to bring them fairly out. To make this thin ink, a little of the very fluid lithographic varnish (known as tint varnish or S.H. varnish) is added to the mixture of turpentine and ink. The kind of press best adapted for collotypic printing is the roller lithographic press—like those commonly used in France and Italy. A Waterloo's autographic press is very well adapted for the work; but the scraper press does not answer so well. You see that the press I am using consists merely of two rollers, with the tympan and bed riding between them.

The plate having been inked, and the paper laid on, a moist sponge is passed over the back of it. I then put on a few thicknesses of blotting-paper, and a sheet of india-ubber an eighth of an inch thick, shut down the tympan, and pass through the press. Here, then, is the result.

Any kind of paper may be used for collotypic printing, but if it be desired to imitate silver prints, a thin and rather soft enamel paper must be used, and the prints must be varnished with a varnish prepared by dissolving two parts of white shellac, and one part of mastic in a convenient quantity of methylated spirit. The strength of the solution will depend on the effect required, and it is scarcely necessary to say that the varnish must not be allowed to chill. Here is a print; I will varnish one half of it, and, when dry, you can compare the two sides.

The process which I have demonstrated to you is practically that of Professor Husnik, as set forth in his invaluable work on the subject,* and, if I were to give you the leading features of the various collotypic processes, I should occupy several hours in doing it. The characteristic feature of the Albertype process consists in covering the glass plate with a film composed of gelatine, albumen, and potassium bichromate, and exposing this to light through the plate of glass, so as to make that part in immediate contact with the glass insoluble, washing off the soluble portion in warm water, so as to leave a very thin film of insoluble gelatine, capable of serving as a bond between the glass and the actual printing film, which is now applied.

Mr. J. R. Sawyer, of the Autotype Company, has elaborated a process by which he has produced magnificent results, some of which you see hanging up all round the room. You will see among these representatives of almost all classes of photographic work—ancient manuscripts, coins, architecture, landscapes, engineering works, and book illustrations. Directly opposite to me is an exceedingly fine collotypic print of Norwich Cathedral, and this is from one of Mr. Sawyer's own negatives. You will also notice a series of prints representing the great public engineering works of France, which are now being printed by the Autotype Company, under the direction of Mr. Sawyer. The production of this series, regularly, and in large numbers, proves the thorough practicability of the collotype process when in careful hands.

You see before you some admirable specimens of collotypic printing, by Messrs. Braun, of Dornach, Messrs. Strumper and Co., of Hamburg, and Messrs. Wright and Co., of London.

The next great step in collotypic printing is the application of steam machinery to the process; the difficulties of wiping the plate, inking, and taking off the paper, by machinery, are considerable, but these difficulties are being gradually overcome.

RESEARCHES ON THE ABSORPTION OF THE ULTRA-VIOLET RAYS BY VARIOUS SUBSTANCES.

BY J. J. SORET.†

With a spectroscope having a fluorescent eye-piece, the phenomena of absorption for the ultra-violet rays can be observed with great facility. The author has employed such a spectroscope with quartz prisms and lenses, and with it has studied a large number of bodies which are colourless in the ordinary sense, but still intercept a part of the invisible rays. For the source of light induction sparks were used, and the parts of the spectrum specially studied were the cadmium lines to 26, the last three zinc lines 27—29, and the last three aluminum lines 30—32. He not only confirmes Professor Stokes's result that quartz exercises a sensible absorption upon the alumium line 32, but finds in addition that lines 27 to 30 are weakened; and, by a sufficient thickness of Iceland spar, are altogether stopped. Distilled water of 10 mm. thickness is less transparent than quartz, but for greater thicknesses it is more transparent: for 1·16 m. of water allowed the zinc line 28 to be distinguished, but it was stopped by a very much smaller thickness of quartz. It may, therefore, be considered as almost perfectly transparent.

In aqueous solutions, the absorption depends upon the strength of the solution, not upon the quantity of water.

Bases and acids carry their absorbing properties into salts.

Besides the iodides, nitrates, and alkaloids, which have already been examined by Stokes and Müller, the author mentions that many other substances gave rise to absorption-bands in the ultra-violet—such as alkaline chromates and bichromates, potassium nitrate, sulphates of didymium and cæsium, potassium permanganate, and sulphurous acid in solution.

The author considers that quantitative determinations could be made for some of these bodies by spectrum analysis

RECOVERING THE PRICE OF A PORTRAIT.

At the Bloomsbury County Court on Friday last, the case of Boyle *v.* Chaplin was heard before Mr. Judge Russell, in which the plaintiff, described as a photographic artist, sued the defendant, a private gentleman, to recover the sum of eight guineas, under the following circumstances; both plaintiff and defendant were legally represented. The plaintiff, in opening his case, said he was a photographic artist, residing in the Mornington Road, and was called upon by the defendant's wife to execute a full-sized picture of herself to be coloured in oil, and which she stated she intended as a present to her husband on his birthday. The picture was carefully executed, and sent with the account to the address given by the defendant's wife, but as no money was forthcoming, the present proceedings were taken. The order for the delivery of the picture being proved, the plaintiff's case concluded by his stating that he had made several written applications for the money without receiving any reply.

The defendant then called, stated his wife possesses a deed of judicial separation, and besides alimony had a separate estate of her own, and, therefore, did not consider himself in the slightest degree liable; the summons had been served on his wife who had forwarded it to him by post, and he merely attended out of courtesy to the Court.

At this stage of the case, the wife's name was substituted for the defendant's, and who, on being called, said she never gave the plaintiff to understand that the picture was for her husband, as he was not worth it, she, moreover, told the plaintiff she was dissatisfied with the portrait, and sent it back, requesting a fresh one to be executed, and that as the plaintiff refused this request, she considered she was not liable as the picture was by no means satisfactory.

The plaintiff being recalled, said the defendant had returned the picture three months after it had been sent home, and no complaint was made till the present proceedings were commenced.

The picture was here handed into Court, which his Honour considering it was a very creditable production, told the defendant so, and that under the circumstances of the case he had no hesitation in giving judgment in favour of the plaintiff for the full amount claimed with costs, and ordered payment to be made forthwith.

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* Das Gesammtgebiet des Lichtdrucks. J. Husnik. 3 Mark. Hartleben, Leipzig.

† *Comptes Rendus.*

The Photographic News.

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THE BRITISH ASSOCIATION.

The forty-eighth meeting of the British Association was opened on Wednesday week, at Dublin, Mr. W. Spottiswoode, M.A., LL.D., President. The meeting has been, in many respects, more than usually bright, enthusiastic, and successful in numbers and interest, the *soirees* being exceedingly gay and attractive, and the attendances excellent. Year by year, however, the annual meetings of the Association fall off in photographic interest. Its aid is sought in various departments as that of printing may be, but there are few of the *savans* practically interested in photography, and few papers in connection with the subject brought before the sectional meetings. M. Janssen exhibited solar photographs, and read papers on his mode of applying photography to solar observation. Captain Waterhouse read an interesting paper on the Reproduction of Maps by Photography, which will be found on another page. Captain Abney was not present, although his name was on the committee of one of the sections; his photographic communications are generally reserved for strictly photographic channels. The only essentially technical paper of a photographic kind was that read by Mr. Willis, which will be found on another page.

At the meeting of the General Committee, held on Monday, Sheffield was proposed as the place for the next meeting, £3,300 having been already subscribed as a guarantee fund for expenses. Dr. Ullman is to be the next President. As the name is not a very familiar one, we quote the *Times'* report of his nomination:—"Professor Huxley in moving that Dr. George Ulman, F.R.S., be appointed President-elect for the Sheffield meeting, said he was one of the most distinguished cultivators of biological science in these islands, and held a position of great importance both in Ireland and at the other side of the Channel, having last filled the chair of Regius Professor of Natural History in Edinburgh. Since he had retired from that position, he had become resident in London, where he continued his researches; and his contributions to the branch of science, which he had pursued unintermittingly for the last thirty-five years, had been of the greatest possible value to any one engaged in the same pursuits."

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PHOTOGRAPHY FROM THE OUTSIDE.

Photography, since it was first introduced to the public about thirty years ago, has undergone many varied phases of public estimation. It was at first greeted with wonder and admiration, as one of the fairy tales of science. When it began to do regular service for mankind, and became a professional portraitist, it was gladly accepted and patronized, and, at the same time, derided and abused. The shimmer of the Daguerreotype plate was troublesome to the eyes, and the rigid truth of the sun-picture was offensive to vanity and self-love, and the sun was derided as a caricaturist. The Daguerreotype and its reflecting surface passed away, and the paper photograph came into vogue, and photography has been regarded with increasing prevalence as a libel on the human face divine, and a travesty upon art. It has become of late years the legitimate butt of every scribe who could write a newspaper paragraph; and as the practice of sneering at the alleged shortcomings or imperfections of the art has a material influence upon the status of the artist, we have always regarded the habit with disapproval. Latterly the achievements of photography in connection with various branches of science have tended somewhat to its rehabilitation, and we have pleasure in reprinting an interesting article from Dickens' *All the Year Round*, on "Some New Uses of Photography."

The writer commences by recommending all, who have a chance, to learn photography—advice which we cordially endorse. If he have learned the art himself, however, it is probably recently, as he is curiously unfamiliar with some points in connection with it. The allusion to "our countryman, Mr. Goodbury," as the inventor of the Woodburytype process, is probably a printer's error; but this would scarcely account for the statement that photo-lithography has not been brought to perfection because "the grease of printer's ink makes it difficult to print directly from the photographic plate, as any one can understand who remembers that the surest way to spoil a photograph is to touch it with greasy fingers." On the same principle, a copper-plate engraving, being easily spoiled by touching with greasy fingers, should render the printing of such impressions a difficult task. Neither would it explain the curious description of the carbon process, in which a sheet of paper covered with a mixture of gelatine and powdered charcoal is sensitized by bichromate, is then fastened to a negative, and "is ready for use in the camera." For what use in the camera we don't know.

That element in photography which most closely trenches on the marvellous naturally interests the essayist most, and he dwells on the fact that photography can produce transcripts of things unseen by the human eye, and suggests possible uses of great importance for the application of this power. Speaking of the existence of valuable parchments which had once held most important manuscripts, cleaned off or erased by ignorant monks who required fresh parchment for monastic accounts, he suggests that such parchments, if photographed, might restore to the world no one knows what of lost literary treasures. Referring to the story related some years ago by Dr. Vogel, of a young lady whose portrait was spoilt by the face presenting a spotty appearance, and who, a few days afterwards, developed a mask of smallpox, the incipient eruption having been registered on the photographic plate before they were perceptible to the eye, he suggests a system to medical men of photographing their patients.

After this power of photographing the invisible, the idea of photographs in colours is fascinating, but misleading. The writer states that "you can easily get negatives which will give red, blue, or yellow impressions, by interposing respectively a green, orange, or violet screen." When he himself has acquired photography, he will probably be disgusted to find that this easy operation seriously tasks his powers. He informs his readers that M. Becquerel has reproduced colours by using an "iodized plate treated with salts of silver"! We were under the impression that Becquerel used a subchloride of silver surface, and, following his lead, we have ourselves, prepared subchloride of silver and reproduced colours by the action of light. It is, however, as our writer remarks, to the permanent reproductions ofcolour that attention is desirable, and he ends his article by again adjuring his readers to learn photography. "Learn photography," he says, "if you have the chance. Who knows but you may hit upon the mode of fixing the colours of things as we see them?" Who knows, indeed?

DELAY IN PUBLISHING PHOTOGRAPHS OF THE CHALLENGER EXPEDITION.

The following letter on the above subject appeared in the *Times* a few days ago. The writer appears to think that the delay may be connected with the rarity of sunshine in this country; but since photo-lithography is worked with much skill at the Royal Arsenal, Woolwich, photo-zincography at Southampton, and other photo-mechanical processes at Chatham, where sunshine is unimportant, there can be no such valid excuse for the delay:—

"Sir,—Being desirous of obtaining photographic views of some of the places visited by the *Challenger* in her five years' cruise, I wrote to the head of the scientific staff, stating those I wished to obtain, and offering to pay for them. This was in January last, a year and a-half after the cruise had been brought to an end; but the reply to my request was to the effect that none of the photographs had been published. Eight months more have now passed, and yet the views are unobtainable, and I cannot ascertain that the public have had any opportunity of inspecting the volumes containing the series, which, I may add, were to be seen on board the ship when I was taken over her in Sydney harbour.

"Will you allow me to ask what reason there is for declining to allow the public to share to some small extent, and at their own expense, in the results of the expedition, towards the costs of which they contributed? Nearly two years and a quarter have now elapsed since the return of the ship, and granting that we are not blessed with much sunshine in England, I yet contend that sufficient time has been given to the photographic staff to enable them to print all the copies required for illustrations to the scientific reports of the members of the expedition, or for distribution among learned societies in this and other countries. Is it not reasonable to ask that the public may be allowed some return for their money, or, at any rate, may have the opportunity afforded them of seeing what it purchased?"—Yours faithfully,

Eltham, August 10. "A. G. G."

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SOME NEW USES OF PHOTOGRAPHY.*

If you have a chance of learning photography, do. Not that you may swell the number of those amateurs who fill their friends' albums with hideous groups—your amateur is seldom content with a single face; it takes him so much trouble to arrange his apparatus, and make his chemicals work properly, that he thinks nothing less than a group can repay him—but that you may be able to help yourself and the public in whatever business or profession you may have chosen. For there is scarcely a trade, except that of public speaking, which is not directly or indirectly helped by photography. Doctors, astronomers, engravers, architects, map-drawers, surveyors, are all indebted to this art.

Not only does photography reproduce, with absolute perfection, details which the most scrupulous eye-work could not trace without errors, but it actually sees what is invisible; the sensitive plate receives impressions which altogether escape the human eye. Thus a French ambassador in Greece, Baron Gros, who used to amuse himself with photography, took one day a view of the Acropolis. He never looked at it again till he was back in Paris; and then, examining it with the microscope, he was astonished to find on a stone in the foreground the figure of a lion, devouring a serpent, in the very earliest style of Greek art. Here was something which none of the antiquarians, who have counted every stone in the old temple of Pallas Athene, had ever noticed; the sun had found it out, and the Frenchman's photograph had made it evident to the eyes of men. It is the same with MSS. The parts that have through age and damp become illegible, stand out in the photographic copy as strongly marked as the rest. Ink gets yellow with time; the peroxide of iron, which gives it its colouring, is gradually oxidized until even a magnifying-glass can trace nothing on the parchment; but the chemical effect remains; the ink, which has become invisible, still has power to diminish the susceptibility to light of those parts on which it was laid; and so the writing, which had long since disappeared, comes out black and legible by the aid of the camera.

This use of photography is very valuable to the classical scholar. It gives him a chance of recovering the MSS. of Greek and Roman authors, whose works were supposed to have perished. Besides the burning of libraries like that of Alexandria, and the natural decay when rolls of parchment were stored for safety in damp cellars, there was, all through the dark ages, a cruel custom of taking classical MSS. and using the parchment up again, after rubbing off the ink as far as possible with pumice-stone. Thus, if a new account book was wanted, and the monastery funds were low, instead of buying a few new skins, brother Paulus, sub-prior and bursar, thought he was doing a very clever thing by diving into the library and picking out a volume containing, perhaps, the now lost books of Livy; perhaps half-a-dozen Greek plays—anything, except, of course, the writings of the fathers and those of Aristotle, whom, somehow, the mediæval schoolmen had come to look upon with as much reverence as if he had been a father of the Church. The said volume was handed over to a serving-brother, who washed it, pumiced it, and got rid as wholly as he could of the ungodly writing, which it was a pious work to render illegible. This sort of thing went on most vigorously just before the discovery or introduction from the East of paper-making; for, of course, as civilization advanced, the uses of parchment and vellum multiplied much more rapidly than sheep and calves did. So it comes to pass that in almost every monastery there are some of these palimpsests (*i. e.*, rescraped parchments) on which bills and expenses, or monastic and theological rubbish, covers something for which scholars have perhaps long been vainly searching. Such palimpsests have hitherto been treated with acids of various kinds to get rid of the new ink, and then dipped in a solution of tannin to bring out, if possible, the old writing. All this washing, however, too often had the effect of making the whole hopelessly illegible; whereas photography does away with the need of it. In the sun picture the effaced original comes out often as clearly as that which was written afterwards; and then, of course, it is no very difficult task to read between the lines. But this application of photography is useful, not to the scholar only, but to the statesman, or merchant, or special correspondent, or to anyone who wants to send letters that nobody else can read. If you write with a solution of sulphate of quinine, the paper will look like a blank sheet over which a fly has traced a few very faint marks; you may safely send it even by way of the Russian headquarters, unless, indeed, there is a photographer there who knows the secret. In that case he has only to take a sun copy of your seemingly blank sheet, and what you wrote becomes as legible as the old "sympathetic ink" of our grandmothers used to when held before the fire. Bankers, too, may sometimes find it convenient to have doubtful cheques photographed. However carefully the original amount may have been washed out, the sun will bring it up again, to the confusion of the forger. As for doctors, it may be worth their while, now and then, to photograph their patients, when they suspect there is any eruptive disease not yet visible. Mr. H. Vogel, of Berlin, cites the case of a lady who had always (as the phrase is) "taken well." She "came out" one day all over little black spots. The photographer was blamed—his chemicals must have been bad, or the plate could not have been properly cleaned. Two days later, however, it became clear that the lady had small-pox; in fact, she died of it soon after. Yellow, as everyone knows, comes out black in the sun-picture, so her face must have been covered with very faint yellow spots before any eye could trace the least mark upon the skin.

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* *All the Year Round.*

But, besides bringing out the invisible, photography helps doctors to study at their ease that which is with difficulty visible. Everyone who has been to a "specialist"—a doctor who has made one organ his study—knows that there are instruments for looking into certain parts of the human body. Thus there is an ophthalmoscope for inspecting the interior of the eye, a laryngoscope for looking into the throat, an otoscope for examining the ear, and many others. For the individual case, the eye of the operator is, of course, enough; he needs only to look and act, just as your dentist looks into a little mirror, awkwardly forced into your mouth, when he is preparing to stop a tooth. But the peculiarities of one case, faithfully reproduced, may be of the greatest value in dealing with other like cases, as well as in training young doctors Hence it is suggested that a dark chamber should be added to these various "scopes," so as to obtain a photograph of what they give an insight into.

How this may quite readily be done it is rather difficult to explain; but if any one will go to Kew or to Greenwich, and look at the barographs, thermographs, magnetographs, and other like instruments for registering by photography the rise and fall of the mercury in barometer and thermometer, and the continual variations of the magnet, he will see how it may be managed. In all these there is an apparatus with a system of lenses for catching a ray of light from the top of the column of mercury, or from the point of the magnet, as the case may be; and there is a sheet of sensitive paper which, unrolled by clockwork, is passed under the influence of the luminous point. The sensitive paper is, of course, kept in a dark chamber, through a narrow chink in which the ray caught from the mercury or the magnet is brought to bear on it, leaving its mark in a wavy line, the curves of which show the variations which it is desired to put on record. For this invention Sir Francis Ronalds and Mr. Brooke got the Government prize of five hundred pounds for "the best plan to save labour in taking long series of observations." What that labour is may be judged even by those who have tried such a simple thing as keeping a rain-guage. Women can do it better than men, says Professor Piazzi Smith, whose wife took the careful sets of observations for determining the moisture, dew point, &c., at various points up the Peak of Teneriffe; you see it is something like work in a sick room, going to look at your instrument every half-hour exactly, just as sometimes it is needful to give a patient a spoonful of drink at the like interval. But even women's patience has a limit; and the photographic registers record, not the variations of each quarter or half-hour, but the changes as they go on continuously. The laryngoscope has been provided with a photographic register by its inventor, the late Dr. Czermak, of Leipsic; and M. Marcy, a French doctor, has applied the same kind of arrangement to the sphygmograph, or instrument for measuring the beatings of the pulse. The ordinary sphygmograph registers the pulsation by means of a pencil adjusted to the longer arm of a lever, of which the shorter arm is moved up and down by the pulse itself. The variations are thus magnified, and so made more visible to the eye. Put instead of the pencil a black screen pierced with a minute hole, and let the light through this hole be caught on a moving band of sensitive paper, and you will get a photograph of the movements of the pulse. In the same way the play of the muscles, the variations in temperature of the blood, may all be described in a series of curves like those weather-curves that we now see hung up in almost every public room. To the on-looker all this may seem merely ingenious trifling; but scientific men know better. One instance in which such investigations have already borne fruit is the muscular mechanism which is set going by the different passions. Dr. Duchenne, of Boulogne, got up artificial changes in expression by galvanizing the various small muscles which lie beneath the skin of the face. He had the expressions corresponding to each galvanic shock photographed, and thereby found out what set of muscles is at the service of each several passion. It was the sight of his photographs which led Mr. Darwin into the line of thought which resulted in his book on "The Expression of the Emotions in Man and Animals."

One of the great uses of photography is to give an accurate notion of the conformation of mountain districts. Those raised maps of Switzerland could never be much more than guess-work as to everything except the broadest features, had not every corner of the Alps been photographed with the special view of learning all about the physical geography of the country. The patient photographer gets his baggage (lightened by the substitution of waxed paper for collodion plates) taken to a peak from two thousand five hundred to three thousand five hundred yards high; that is found the best height for showing the direction of the valleys. He begins at seven a.m., and sets his apparatus to the north; then he goes to the west, and so on. By mid-day he has reached the east, which quarter of the horizon is then lighted in the least unfavourable manner.

The dry process, by-the-way, dispensing with the tent, the bath, &c., and substituting for collodionized glass, paper prepared with gelatine and bromide of silver, is invaluable for the traveller. Under the old system, if he was separated from his tent, he was helpless. A Frenchman, sent out expressly to take photographs on the Upper Nile, lost his tent in Soudan, and was therefore unable to take a single view all the way down to Khartoum.

Map-making by photography has, in France, been substituted several times for the ordinary methods of survey. Of course such maps are absolutely perfect, supposing the necessary calculations required in piecing together the different views are correctly made. This is a troublesome affair; a map of the environs of Grenoble, embracing about twelve square miles, required twenty-nine views taken from eighteen stations.

M. Chevalier has, however, invented a much more rapid method, whereby two views—panoramic—one supplementing the other, are sufficient. They are taken by means of a cylindrical "dark chamber," with a very narrow vertical slit in it. The cylinder revolves slowly round a vertical axis, and by means of a reflecting prism the image of the landscape is thrown on a circular sensitive plate at the base of the cylinder. The French hope for great results from this method applied to military map-drawing. They certainly have a good deal to learn in that direction, unless they have vastly improved since the late war, in which the Prussians knew France perfectly, while there was scarcely a French general who did not blunder grievously, owing to total ignorance of the geography of his own country. One can readily imagine how the labour of copying and reducing to scale is lessened by photography. In this way a rare map may be copied in a couple of hours. No wonder most of the European war-offices have their photographic department. Its usefulness is not confined to map-drawing; they can even take instantaneous photographs of the trajectories or curves described by shells and cannon-balls.

(*To be continued.*)

CLEANING OF PLATES AND LENSES.

All persons who work in photography know, or should know, that to clean lenses, and to preserve the polish of their surfaces, they should not be wiped with a cloth, but after having removed the dust by means of a brush, they should be covered with a thin coating of grease, then wiped with a piece of very soft chamois. An amateur asserts that for this purpose there is nothing better than chicken grease. Without contesting the merit of this fatty body, we simply use tallow, which we recommend not only for lenses, but also for plates which are to be collodionized. The dealers in glass plates for clichés coat them with grease, and simply wipe them before delivering them to photographers, and it is known that these plates generally give very pure clichés without any other cleaning. Many methods have been suggested for removing the varnish from old plates. A mixture of benzine and alcohol in equal parts, agitated and poured on the plates, generally acts very quickly and very well. The last traces of reduced silver which may yet adhere are then removed by iodized alcohol (alcohol 100, iodine 0·50). When the surface is properly cleaned it is rubbed over with the finger, or a tuft of cotton lightly impregnated with tallow, and wiped dry. Plates thus prepared may be kept indefinitely, and are protected from dampness, the enemy which too often interposes itself between the collodion and its support. It is well to rub the plates, whatever may have been the previous mode of cleaning, with a little talc, which increases the adherence of the sensitized coating, and does away with the gelatine or albumen, the use of which would otherwise be indispensable for the preparation of dry plates.—*Bulletin Belge.*

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Correspondence.

IRON SPOTS IN ALBUMENIZED PAPER.

Dear Sir,—My experience for a long time past enables me to endorse the statement of Messrs. Marion & Co., that, "practically speaking, there are no iron spots in Rives paper," and I must confess to a decided preference for this make, notwithstanding the sad troubles of our friend, Mr. Durand.

During the past week, I have been working hard at 10 by 8 views, and have been using Marion's "medium Rives," and have not had occasion to reject a single print. I enclose two or three for your acceptance and inspection. I think it will puzzle you to find a single iron spot on any of them. I need not say that I have no pecuniary interest in the sale of Marion's or any other make of paper; but I think that it is only fair to Messrs. Marion & Co. to state, that Mr. Durand's "peppery" difficulties, are not experienced by everybody who uses their paper.

I have been using this summer the "Cross Swords," and Marion's "Medium," and "I can be happy with either"—in fact, they are all I can wish for. My advice to Mr. Durand is, "Stick to your Saxe," and get rid of your pepper.—I am, dear sir, yours truly, Henry Hayman.

Launceston, August 19*th.*

[The landscapes forwarded are very charming, and quite free from spots.—Ed.]

Dear Sir,—Replying to Mr. Durand's letter in your last issue, whether the spots in the piece of paper sent you by him, be iron spots or not, we again say, speaking of thousands of reams that pass through our hands, a not inconsiderable number of which are sent out, albumenized by ourselves, and not of a single sheet or piece that, *practically speaking*, iron spots are not found in the Rives photographic paper. We know that every possible care is taken, and the best material procurable is used in the manufacture of this paper, and, therefore, the makers need no recommendations on this head from us. Whatever may be the demerits (or merits) of Rives paper, it is unquestionably the best photographic paper in the market, as the very much larger use of it, over any other, strikingly testifies; and here, as far as we are concerned, this correspondence will cease.—Yours truly, Marion and Co.

22 *& 23, Soho Square, London, W., August 22nd.*

PS.—We have not received the piece of paper sent to you by Mr. Durand, and which you intended to forward to us.

[The piece of paper, being a small scrap, was, unfortunately, mislaid, and, we fear, destroyed.—Ed.]

A WARNING TO AMATEUR VARNISH-MAKERS.

Dear Sir,—Having to make some negative varnish, I put the bottle containing the spirits and gums in a saucepan of water, and placed this on the kitchen range to hasten the dissolving of the gums. After a time, observing the spirits rising out of the bottle, I was in the act of taking it away when the contents blew over me, and, unfortunately, caught fire at the same time. I was in a mass of flames; but I managed to put them out (to the detriment of a curtain that happened to be near me), but not before I was severely burnt, especially about the arms and face, from which I am not likely to recover for a long time. Luckily I had a beard, and that protected part of my face; but was burnt, as well as my hair, to a cinder.

The way I account for the explosion is this; the range being a closed one, having no chimney, the vapour of the hot spirits could not escape, and, unfortunately, caught fire the very instant the varnish blew over me.

I have many times made varnish over an open fireplace, and without accident.—Yours respectfully, Sydney Smyth.

Western-super-Mare.

YELLOW LAMP SHADES.

Sir,—A letter from Mr. C. R. P. Vernon, in your issue of the 7th. June last, recommended Hill's bonnet-candle reflector, with a piece of yellow paper tied over the opening (at the side) as a good lamp for dry-plate workers when in hotels, etc., away from home.

I have in consequence procured one; but imagine, the light which issues from the top of this reflector would fog any of the very sensitive dry plates of the present day, as the light from this part could not be screened by paper without catching on fire.

Would you, therefore, kindly prevail on Mr. Vernon to let your readers know how he manages to screen the light from the top of this reflector?—I remain, sir, yours truly,

Henry Dennie.

38, *Melvelle Street, Ryde, Isle-of-Wight, August* 20*th.*

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Proceedings of Societies.

Photographic Society of France.

At the meeting of the 7th of June, M. Davanne, President of the Administrative Council, occupied the chair.

The President presented to the Society M. Levitzki, member of the International Jury for Russia at the Exhibition, and Mr. Wharton Simpson, Editor of the Photographic News, and bid them welcome to the meeting.

A letter from M. Chardon was read by the Secretary. The writer referred to a description of the Warnerke emulsion process, given by M. Pitteurs in the *Bulletin Belge*, bearing date 5th January, 1878, from which it would appear that the formula for that process differed but little from those of a process which M. Chardon had communicated to the Societe Francaise in March, 1877. M. Chardon at the same time forwarded for deposition in the archives of the Society, a sealed envelope containing some new formulæ, with which he had worked out some fresh experiments, and arrived at results that were not yet quite complete. His object in so doing was to ensure to the Societe Francaise the admission of a claim of priority should a similar case arise.

M. Davanne announced to the meeting that the Council of the Society, in conjunction with that of the Photographic Association, proposed to give a banquet to the foreign members of the Jury of Class XII at the International Exhibition; the proposition was at once accepted, and a committee appointed to make the necessary arrangements.

M. Perrot de Chaumeux next communicated to the Society extracts of interest from the home and foreign technical journals. In the Photographic Section of the American Institute a discussion has arisen on the advantages of iron oxalate as a developer. The President, Mr. Newton, maintained that the use of this salt made a longer exposure necessary than with that of the alkaline developer; though its action was less rapid, however, the results obtained were excellent. Mr. Newton prepares the developing solution by adding to a solution of from 40 to 50 parts of neutral potassium oxalate in 480 parts of water, a few drops of a saturated solution of iron sulphate sufficient to give the liquid an orange tint; it is then acidulated by a couple of drops of acetic acid No. 8. To obtain the neutral potassium oxalate, Mr. Newton makes a saturated solution of potassium carbonate in hot water, into which he drops crystals of oxalic acid until it is completely neutralized; in cooling the neutral potassium oxalate precipitates, while the supernatant liquid is a super-saturated solution of the same salt. Mr. Swan recommended, in case of the iron oxalate losing its developing properties, to restore them by placing in the solution small spirals of iron wire. By keeping such pieces of wire in the solution it could be maintained in good condition for any length of time.

In the *Philadelphia Photographer* Mr. J. H. Hemming gives the following method for intensifying negatives:—When the ordinary developer of pyrogallic acid and silver does not produce the desired effect, he employs the following formulæ:—

No. 1.—	Pyrogallic acid	12 parts
	Citric acid	10 „
	Water	480 „
No. 2.—	Silver nitrate	5 „
	Water	800 „
	Solution of potassium iodide (1 of salt to 125 of water)	1 drop

He flows No. 1 two or three times over the plate, and then adds No. 2, taking care to watch the effect. The plate must be washed thoroughly as in the ordinary way.

M. Perrot also brought to the notice of the meeting the supposed discovery of Herr Obernetter, which has attracted some attention in Germany. In this process the ordinary method of sensitizing is reversed: the silver nitrate being mixed with the collodion, and the bath consisting of iodide or bromide. This method of preparing collodion had been, in the year 1860, communicated to the Société Français by M. A. Poitevin, and in 1864 the Abbé Arronis, in a pamphlet published at Poitiers, described a tannin process in which a similar method was made use of. At the end of 1871, or commencement of 1872, M. Monckhoven also suggested the preparation of silver nitrate collodion. The credit of the discovery is on this account claimed for France. Another new process for photographing in natural colours is being discussed as being the discovery of Herr Albert. This process is in effect nothing more than that of M. Ducos du Hauron, except that in place of superposing three leaves of coloured gelatine, Herr Albert prepares three litho-photographic plates, with which he presses the three colours one over the other, and thus obtains a picture like that of M. Ducos du Hauron. To the latter, therefore, belongs the honour of this invention.

M. Stefanowski has continued his experiments on intensifying carbon prints by means of potassium permanganate, a method which, some time ago, was suggested by Mr. Swan, and more lately by M. Chardon. The reason why the process had not been more generally adopted appears to be the greenish tint which a print intensified by permanganate assumes; but M Stefanowski asserted that this tint can be modified by various re-agents. Thus, a dilute solution of pyrogallic acid turns it to a sepia brown; gallic acid, and tannin render it a more or less intense black, in proportion to their degree of concentration. A decoction of logwood produces different colours, according to the temperature and density of the dye-liquid. There would seem to be a field for experiment and discovery open to those who work at producing transparent carbon prints.

M. Janssen presented to the Society one of his magnificent photographs of the solar disc; an image produced by an enlargement of 3 diameters of an original negative of 46 centimetres diametre, obtained by the new method of M. Janssen, in which the exposure is reduced to $\frac{1}{3000}$th of a second. It shows the granulations of the sun's surface, and the regions where the granulations are partly effaced by the vast ascending currents of hydrogens.

M. Koziell explained that M. Janssen had sent a similar photograph to the International Exhibition, a second one enlarged to nine diameters, and also a transparent proof.

M. Andouin exhibited to the meeting some bottles for keeping collodion, with an arrangement for filtering the collodion that is poured back after collodionizing. Similar bottles have been for some time in use in England, but made of white glass; M. Androuin conceived the idea of making them of yellow glass, so hat emulsions could also be kept in them.

M. Andra, however, thought it not quite prudent to trust to e non-actinic property of the coloured glass; bromide emulsions are so sensitive that they can with safety be kept only in total darkness.

The President then called on M. Andra to communicate to the meeting the results of his experiments on emulsions. His communication was as follows:—"I have devoted the whole of last month to the preparation of a stock of dry emulsions; in seven different operations I have precipitated nearly 200 grains of this substance, and have had thereby occasion to make some observations which may possess some interest for this meeting. At each operation I took 600 cub. cents. of collodion that had been bromized for more than a year, consisting of a mixture of 400 cub. cents. of resisting, and 200 cub. cents. of pulverized collodion. These 600 cub. cents., one each time sensitized by 18·30 grains of silver nitrate, that is to say, a proportion of 3·05 of silver salt to 100 cub. cents. of collodion, and this quantity I find always sufficient to give an appreciable excess of silver. The result has uniformly been from 29 to 30 grains of dry powder. After every operation I tried the product before putting it away in the bottle, and always found it to be of good quality; but the results were in certain respects very different from those which I had previously obtained with collodions that had only been obtained for a month or six weeks. In the first place, the properties of the cotton, when dissolved, appeared to have become very considerably modified; it had become soluble in alcohol of 40°, and sometimes even in dilute alcohol, so that it was impossible to flow alcohol over the plate before developing. This, however, is rather an advantage than otherwise, as it necessitates a manipulation the less, while the development is quite as rapid as before, thanks, no doubt, to the porous quality impressed on the collodion by great age. On this account, I was obliged to renounce the use of alcoholic varnish, which would have instantly dissolved the film; but fortunately benzine and chloroform varnishes can be employed without risk. In the next place, the film, after fixing and drying, has that whitish opalesque appearance, which, before the true cause was explained by M. Davanne was thought to be due to incomplete fixing. Varnishing, however, will render the negative quite transparent. If it be desired to use a varnish of gum-lac and alcohol, the film must first be gummed, as is done with wet plates that are to be retouched; but this method appears to make very difficult the removal of the film from the plate, in cases where it is intended to transfer the same to gelatine. On the other hand, an emulsion made in this way with old collodion gives negatives of very great purity; there is no danger of fogging, however long the plate may have been left in the developing solution; and, consequently, whenever it is desired, the most intense blacks can be obtained. With one small specimen of the emulsion I have experimented to remove the excess of silver, and that by means not of chloro-collodion, but of iodo-collodion. The reaction was much slower than with a chloride, for, notwithstanding a more than sufficient quantity of alkaline iodide, I established the presence of free silver after it had been allowed to act for more than forty-eight hours. In the end, however, I obtained an excellent emulsion, and one which gave a perfect film. In developing, the image came out quickly enough, after only a short exposure, but it remained feeble, and I was unable to intensify it to the desired degree; afterwards I partially succeeded by means of acid silver, without, however, achieving the intensity that I wished for. Lastly, let me state that I lately found in a cupboard a remnant of an emulsion that had been dissolved for more than twelve months, and which during all that time had not been touched; I coated a plate with it, and obtained a negative perfect in every respect. It was even scarcely necessary to shake up the emulsion for a second or two. This is the first time that I have observed such a result; all my other emulsions have become useless in about six weeks or two months. Unfortunately I am unable to account for the abnormal result recorded above, but it may be inferred, I think, that, under certain conditions, a dissolved emulsion may be kept for an indefinite period."

Berlin Association for the Promotion of Photography.

Meeting of the 17th of May, Professor H. Vogel in the chair.

In reply to a question on the quantity of pure metal contained in the various salts of gold employed in photography, the Chairman gave the following tabulated answer:—

Anhydric auric chloride (Au, Cl_3) contains 64·9 per cent of gold.
Aurosodic chloride ($Au, Cl_3, Na, Cl + 4\,H_2O$) contains 45·4 per cent. of gold.
Auropotassic chloride ($Au, Cl_3, K, Cl + 5\,H_2O$) contains 42·08 per cent. of gold.

He further remarked that he preferred in practice the last named of these salts on account of its being very stable in the open air, and of its crystallizing easily, while the other salts of gold take up water, and, in consequence, the proportion of their constituents is altered. The formation of good crystals is, as he also maintained, a proof of the purity of this salt, for if it contained an excess of alkaline chloride it would be more like a powder.

Herr **Marowsky** observed that on this account he preferred to prepare his own salt by a method which had the additional advantages of yielding it cheaper than it could be bought; he, however, recommended only those to adopt this process who possessed a properly fitted laboratory, as the fumes of chlorine which come off during the operation are not only injurious to the lungs, but also attack and destroy any metal work which may be exposed to their influence. As regards the use of pure auric chloride Professor Vogel observed that it could not be recommended in consequence of its liability to attract moisture from the atmosphere in which it is dissolved. Herr Joop avoided this difficulty by dissolving the salt at once in a known quantity of water, and then using it, whereas Messrs. Wenske and Schaarwächter, who are in the habit of keeping their chloride in a very dry place, never had the occasion to complain of its dissolving in the way above described.

The **President** exhibited an excellent Daguerreotype copy of an oil-painting taken by the late Counsellor L. Sachse, in the year (1839) when photography was first discovered. This photograph is still in a remarkably good state of preservation, though the gilding of Daguerreotypes, which contributes so much to their durability, was not known at the time of its production. It was stated by the President that the photographs produced by Daguerre himself have nearly all perished from the effects of time; the only ones that he could refer to as being still tolerably perfect are kept at Nurenburg, and are the private property of the king of Bavaria. The President also drew attention to the new dry plates of Mr. Swan, as to the value of which he withheld an opinion until he had had an opportunity of trying them.* He thought it possible that, as in the Warnerke process, a successful result with these plates depended on the employment of a strongly alkaline developer, by the use of which, indeed, it was possible to work as rapidly with dry plates as with wet ones. But the danger in using such a strong developer lay in its liability to produce spots.

Herr **Schaarwachter** remarked that to work quickly with Warnerke's plates required a good light; in a bad light they were much inferior in this respect to wet plates. This defect which is generally found to occur with bromo dry plates was attributed by Professor Vogel to the fact that these plates are more especially sensitive to the light blue rays, whose intensity is considerably less in a dull light, while the ordinary wet plates are more sensitive to the violet and dark blue rays, which, in a dull light, are relatively stronger than the light blue ones.

On a question by Herr **Schaarwachter**, a question arose on the best means of avoiding bubbles of albumen when hydrochloric acid is used.

Herr **Richter** described a method which, however, is only successful when the instructions are rigidly adhered to. This method consists in washing the prints (immediately on their leaving the toning bath) in pure water, and then laying them one by one in a pan of water acidulated with pure hydrochloric acid to the extent of from three to five grams to the litre. In this bath they are floated for from two to three minutes, and then washed for from two to four minutes in pure water—not longer, in order that the acid may be only externally washed off, not removed from the interior of the tray. They are then laid in the soda bath. According to Herr Richter's view, the hydrochloric acid in the interior of the paper decomposes a part of the soda, and effects a separation of adhesive sulphur which helps to hold fast the albumen. At any rate, the fault which the operator is most likely to commit, is a too long washing before fixing, by which the hydrochloric acid is entirely removed.

This view was combatted by the President, who saw no advantage in the separation of sulphur, but rather the contrary, in respect to the durability of the prints.

The conversation turned on other means of removing bubbles that have been from time to time recommended.

Herren **Fechner** and **Richter** recommended the use of ammonia in the fixing bath.

Herr **Wenske** proposed a method against bubbles which had with him succeeded even in the most obstinate cases. Albumen paper, before silvering, is allowed to float with its reversed side downwards on a four per cent. solution of a mixture of common salt and ammonic chloride. On this bath it remains until the right side begins to feel sticky, when it must be removed, dried, and silvered as may be required. In this way, the albumen is moistened from the reversed side, and so adheres better to the paper. The addition of salt to the water is necessary, otherwise all the salt would be washed out of the paper. Water must not be allowed to touch the right side of the paper, otherwise the film of albumen would be injured. It is to be wished that the manufacturers of albumen paper would themselves adopt this process, and so spare photographers the trouble.

At the conclusion of the meeting, the President exhibited a very interesting experiment. He first explained that the cloudy opalesque appearance of so many kinds of collodion is due in part to a few cotton fibres that remain undissolved, but in a greater degree to a small quantity of lime contained in the pyroxyline. To illustrate this, he exhibited the spectrum of pyroxyline which is characterized by two lines in the green and the red; the same lines were given when calcium chloride was ignited in front of the spectroscope.

By special desire, the President also demonstrated the absorption spectra of fuchsine and napthaline red. By means of a mirror a beam of light from a gas-flame was thrown on the spectroscope, from which a continuous spectrum was obtained. A tube filled with a solution of fuchsine was then brought in front of the slit of the spectroscope, when the green of the spectrum was altogether extinguished and replaced by a dark absorption band. The colour of napthaline red is scarcely to be distinguished from that of fuchsine, but its absorption in the spectrum is quite different; the napthaline red gives two absorption bands, while fuchsine gives only one.

Meeting of the 7th June, 1878, Professor **Vogel** in the chair.

After the admission of new members, and the appointment of officers for the ensuing year, Herr **Schaarwachter** exhibited a camera and stand constructed for him (after his own designs) by Herr Gareis. Both the instruments met with unanimous approval, more especially in respect of price, which, taking into consideration the excellence of the workmanship, and the working out of a new idea, was pronounced to be very moderate.

Herr **Hartmann**, of the glass works of Siemnes', in Dresden, read a paper on the properties of toughened glass. He remarked that this glass could not be cut by the diamond, a difficulty, however, which he hoped would shortly be overcome. He exhibited (1) several thick pieces of the glass, which, during eight days' cooling, had assumed crystalline forms. Externally, these pieces had no resemblance to what is generally called glass; they seemed rather to be like stone or slag. (2). A piece of plate-glass which, in cooling for the space of a week, had assumed the appearance of opal glass. (3). Ground glass plates. The graining of these was so fine that they would be of the greatest service as supports in the carbon process. In one respect the plates grained by this process possessed a decided advantage over those roughened by grinding or etching, inasmuch as they suffer no injury from external circumstances—as for example, that of being taken up by a dirty or greasy hand. (4). Curved glass tiles for roofs and windows. (5). Photographic glass plates, which were perfectly clear, and are greatly to be preferred on account of their being so much less brittle than the plates in ordinary use. Herr Hartmann expressed an opinion that with the small co-efficient of expansion of this glass cracks in the varnish could be avoided by the use of these plates; but how far this opinion can be substantiated, time alone could show. (6). Some negatives and positives taken on plates of this glass, which leave nothing to be desired. The great durability of the glass was shown by many attempts to break it by throwing it on the ground, letting fall weights, &c. A piece broken by main force showed a fracture nearly like that of common glass. An inquiry as to the cost elicited a reply that the price of the plates could not at present be fixed; but it would probably be thirty per cent. more than those of ordinary glass. Attention was also directed to the peculiar effects of polarization on the surface of the glass when viewed through a prism of calc-spar.

Herr **Quidde** made some remarks on the defects in the original toughened glass, which, in the product now exhibited, had been successfully removed. Formerly, toughened glass was always dull and cloudy, whereas, in its present form, it was perfectly clear and transparent; it could now be cut, and drilled, which before was quite impossible. The first specimens of the manufacture, when in the slightest degree injured, splintered into a thousand fragments; but, as has been shown in the present case, it broke nearly in the same manner as ordinary glass would. Complaints had often been made that toughened glass could not resist sudden changes of temperature; but, according to the assurances of Herr Hartmann, the substance now produced was durable under all circumstances.

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* Of late, he observes, the English journals have been strangely silent, though they were at first very enthusiastic as to the advantages of this invention.

A letter was read from Herr Wilde in Görlitz in which he draws attention to the peculiar adaptatility of his dry emulsion plates for the reproduction of linear drawings, maps, plans, engravings &c., where an intense covering of the white surfaces, and cleaness and transparency of the lines are required. Enclosed in the letter was a sample of such a negative which, without having been strengthened in any way, showed a quite sufficient degree of intensity.

Herr Bergmann, a member of the committee appointed to obtain a relaxation of the rules against sending pyroxyline by post or rail, made a report on the action of the committee up to date. He read to the meeting the petition that had been presented to the Imperial Railway Board in which was pointed out the great injury inflicted on photographic art and industry by those rules, the absence of any proof of the spontaneous inflammability of pyroxyline, and asking for a commision of inquiry on the subject

Herr Quidde expressed regret at finding that Professor Vogel's experiments on the spontaneous combustion of pyroxyline were not mentioned in the petition, also that no reference was made to the proposition to pack the substance for transport in alcohol or water.

Herr Junghaus explained that those points had specially been omitted; the first because it had been proved that a vertical blow on pyroxyline lying on an anvil was sufficient to produce an explosion though a non-dangerous one of the substance immediately beneath the hammer, while the remainder was reduced to powder without igniting; the second because consumers of pyroxyline refuse to purchase it after it had been packed in alcohol or water.

The use of the electric light in photography as practised in England was referred to by Herr Herrmann. A light equivalent to that of 5,000 candles is obtained from a Siemen's machine set in action by a steam engine of five-horse power. Around this are placed the copying frames on a stand one above the other. In this way the operators are independent of the weather, which, in winter, and particularly in the foggy climate of England, is of great benefit; but the principal advantage consisted in the fact that the exposure could be regulated with the greatest nicety by means of the clock alone, a point of great importance in the carbon process, as with so uniform and constant a light the use of the photometre became quite unnecessary. Dr. Vogel corroborated this communication, and added that in England—as for example in the studio of Vander Weyde portraits—were also taken by the electric light. In this case the light is made to fall on the sitter through an illuminating lens, made on the model of the lenses used in lighthouses, and consisting of a series of circular prisms. Whether it was really necessary to work in this way—that is to say, whether there was real advantage in the process, or whether it was use merely as an attraction and advertisement for the public, the speaker was unable to say.

To Correspondents.

⁂ Captain Abney's paper *On the Acceleration of Oxidation*, which appeared in our last, was a paper read before the Royal Society. This statement was accidentally omitted in our last.

Big Hypo.—On referring again to the News you will observe that we are not responsible for the process in question. It is quoted from the *Wochenblatt*. The time of floating we should presume to be two or three minutes, as in other similar processes. The amount of citric acid is 2·5 grammes. The addition of bromine to collodion would naturally make it slower. Acid in cards may very probably be the cause of some spots in prints; but spots of a very similar character come from a variety of causes. Albumenized paper being damp, is one well-recognized cause of spots.

J. Lorge & Co., (Berielle).—The primary cause of the film leaving the paper, is, we should think, the quality of the pyroxyline. Use a sample giving a more powdery film, and also use a little less of the citric acid. Do you prepare the paper in any way? If not, try giving it a coating of arrowroot.

J. H. C.—The effect of which you complain has much the appearance of being caused by a toning-bath used too fresh. You do not state how your toning-bath is made. We have at times seen a similar effect produced by the presence of nitric acid in the silver bath. The effect in the face of the old gentleman with an official chain, is due to the negative, which seems thin in the face, which in nature has probably been very florid, and has not been well lighted—being chiefly illuminated with diffused light.

Transfer.—A condenser is not used for enlarging by daylight; indeed, a condenser is of no service if used in daylight, as it does not condense diffused light. With a condenser you must have a brilliant source of light—such as the sun, a brilliantly luminous cloud, or a flame. For collodion transfer work, simple daylight, with a reflector, will answer quite well.

Dark Tent.—Your questions are of a purely legal character, and we cannot with any propriety answer them. Our answers could only be improfessional opinions which would probably mislead you. As your residence is not more than half-an-hour's ride from the warehouse, we should, if we were in your place, call and seek a personal explanation. 2. We believe that Mr. Vander Weyde's application of the electric light to portraiture answers well. It is patented, and, so far as we know, he does not grant licences. This you will easily learn by making enquiry of him. Of course, it cannot be used without his permission. It involves somewhat costly apparatus.

H. W.—We do not know which photo-typographic process is best. The process should, thereotically, be tolerably easy; but very little success seems to have been attained by it in this country. The American Photo-engraving Company have produced the best effects we have seen; but they preserve their method a secret. Mr. Dallas has been most successful in this country; but his method is also a secret. The best information as to known processes to which we can refer you will be found in Mr. Bolas' lecture which we are printing in the News.

Ingulph.—We should prefer freshly-made starch. Black tones, as involving a more thorough deposit of gold, are most likely to be permanent. The causes of fading are more remote and occult than the mounting materials, or depth of tone, however. There are causes of fading in operation, there can be no doubt, not yet well understood. We believe that the most common cause is more or less imperfect fixation. Prints are often placed in the hypo, without well washing from all traces of the fixing bath, by which a trace of sulphur is liberated, which sets up mischief to be revealed afterwards, sooner or later. Or the fixing bath is used too weak, or for too many prints, or slightly acid. But occasionally the most carefully-produced silver prints seem to fade. The remedy is carbon.

B. Kisch.—The examples of portraiture have come duly to hand They are exceedingly interesting and very excellent—quite equal to the average of high-class work in this country. It interests very much to see such capital work going on in a South African colony. We shall have pleasure in hearing from you often.

A Chump.—We have repeatedly, during the last ten years, described the transfer of collodion pictures. You will find an article devoted to a full description of the method in our fourteenth volume, p. 337, July 22nd, 1870. We cannot, of course, repeat the whole article here, but we may give you some hints on the point of your enquiry. The painters' canvas is prepared by washing for a few minutes with warm water, soap, and a little washing soda, applied with a flannel until the horny cuticle is removed, then thoroughly rinse with clean water, The canvas, when dry, will have a matt surface, and water will flow freely over it, without being repelled by the oily surface, as would be the case before washing. A warm, weak solution of gelatine, from five to ten grains to the ounce, is then applied with sponge, and allowed to dry. Take care not to touch the prepared surface with the fingers. When the transfer is produced, and ready for transfer, the film having been loosened by the action of a weak solution of citric acid, take a piece of tracing-paper, the size of the film, and lay it upon it, turning over upon the paper an edge of the collodion film. The two may now be easily lifted together from the plate, and the film laid on the prepared canvas. A sheet of blotting-paper is laid on the film, which is gently pressed down in contact, the squeegee being used to remove air-bubbles. The blotting-paper and tracing paper, are then lifted away, and the picture left to dry.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. Bevan, Lowestoft,
Photograph of Walberswick Ruins.
Photograph of Convent, Dunwich.
Photograph of Gates, Bishop's Palace, Dunwich.
Photograph of Church and Ruins, Dunwich.
Photograph of Cove Hythe Church.
Photograph of Interior of Southwold Church.

The Photographic News, August 30, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

A Travelling Photographer en Grand Seigneur—International Criminal Photography—Social Gatherings.

A Travelling Photographer en Grand Seigneur.—During the recent solar eclipse in America, the scientific men who took part in one of the expeditions were materially aided in their work by a photographer, who placed at their disposal his travelling van and apparatus. It might be supposed that a travelling photographer could hardly render any valuable assistance, but we have it both from the *Times* and the *Daily News* that the aid thus tendered was very welcome and very efficient, and the correspondent of the former paper cannot say enough in praise of the moving studio in question. That our readers may understand the matter better, however, we must remind them that travelling studios in America are very big things at times. Of one, we had an account not very long ago, a floating edifice built for navigating the great rivers of the States and Canada. In this case, the studio was fitted up in a most luxurious fashion, superbly fitted waiting rooms and gallery forming a part of the craft, in which were to be found all the latest improvements and modifications in portraiture. Indeed, portraits were taken on board, we were assured, as stylish and as well as in most large cities. The proprietor shifted his quarters as frequently as he desired, being towed from one locality to the other without difficulty. No doubt he heralded his presence by "an agent in advance," and he stopped just as long or short a time as he considered desirable for his business. We do not know the nature of the travelling studio which was placed by its proprietor at the disposal of the Eclipse observers, but from all accounts it appears to have been particularly well fitted up, and excellently well provided with all that these gentlemen stood in need. In this country, the travelling photographer is a more humble individual; but he and his business are not to be despised for all that. He not unfrequently possesses a good collection of apparatus and his portraits on these occasions are skilfully and happily finished. In fact, in many respects, he is very advantageously placed, and enjoys facilities which others do not. They more easily secure a reputation, due in the main to two reasons: they usually produce only collodion positives, the delicate film of which is especially suited to portraits which are never so fine and detailed upon paper, and in the second place their models are more easy to deal with, and come to them under more favourable circumstances. The half-crown or shilling positive executed off-hand—generally a group of pedestrians or holiday-makers who suddenly make up their mind to the ordeal—is usually a very creditable performance, and it is, as we say, due more especially to the circumstance of the models not having undergone very elaborate preparation, as also the delicate character of the film upon which the image is secured that the success is due. At the same time, it is idle to deny that some travelling photographers are by no means ignorant and unskilful operators, and although they may not carry on their business in the grand and extensive manner of their American brethren, there are not a few in this country who pursue their calling very successfully.

International Criminal Photography.—It is stated that the head of the police at Berlin has resolved to do all that can be done by photography towards suppression of crime upon the Continent, and has evoked the aid of other police authorities in the capitals and cities of Europe. Very near all the state prisons in this country and abroad now have recourse to the camera for the purpose of recording, as accurately as possible, the criminals that come under their jurisdiction, and, as our readers are aware, the custom of photographing prisoners has prevailed with u for years past. But the Berlin chief of the police desire to do more. He seems to have conceived a special horror for international offenders: we suppose from the fact that recently discoveries have been made, tending to show that the doings of Hoedel and Nobling have been fostered abroad. Whether, or not, the recent attempts to murder the Emperor of Germany have any widespread origin, or were concocted in or out of the country, it is pretty certain that they have been instrumental in turning the attention of the German police to other quarters besides their own towns, and it is now sought, by means of photography, to establish records of crimes of an international character. Berlin, for this purpose, has caused to be produced a set of criminal albums, similar to one another, and containing portraits of all the most noted criminals of recent years. These albums form the first edition of a work which will probably be continued into a long series of volumes. We do not know at what period further issues of this interesting work will be made, but probably at intervals of about a twelvemonth we shall have fresh editions—or, rather, fresh volumes—issued. What the German Government now desires is that every other European Power shall issue a similar work, and exchange copies. Great Britain, France, and Russia are especially requested to publish such volumes, and already the German government has despatched the volume to its neighbours as a polite intimation of what is wanted in return. England, no doubt, will be particularly requested to comply, for we have a bad name abroad as to the harbouring of loose characters. Unfortunately, we shall not be able to help the Germans just where they most desire it. Although we have an extradition treaty as regards criminal offences, we take no heed of political prisoners, and the Arnims and Rochéforts of the Continent are at liberty to go where they will unmolested within the confines of Great Britain. Still, we cannot help thinking that the steps of the Berlin police in thus acquainting us with the appearance of all their bad characters, and asking us to show them what ours are like, will work considerable benefit; and thieves and swindlers will be wary how they present themselves in one capital or the other. As the German album is provided too with a short and succinct account of all the sitters who have sat for their portraits, and gives, where practicable, marks and signs whereby they may be identified, it will be always a risk for any of them to run, or to bring themselves under the vigilance of police in foreign towns. We are not aware whether our own Government has yet decided to respond to the Prussian invitation, but if they do not, if will not be for lack of material.

Social Gatherings.—The dinner given to the jurors connected with photography at Paris seems to have been a grand affair, M. Jules Simon having been induced to take the chair on that occasion. Mr. William England worthily represented English photographers; while Austria was as capably impersonated by Fritz Luckhardt. The event of the evening was, of course, the speech of M. Jules Simon, who pointed out the many applications of photography, and the benefits that have accrued to the world at large since the discovery of that art. Social gatherings of this kind always promotes good feeling and fellowship, and it is a pity that they are not more cultivated among photographers. We see that both in Paris and Berlin, when the sittings of the meetings are suspended, it is the custom for the members to meet *en reunion* once a week, and are thus afforded an opportunity for friendly discussion, and for the interchange of opinions on the subjects in which they are chiefly interested.

SOME NEW USES OF PHOTOGRAPHY.[*]

We have spoken already of the photographic weather registers, which, as it were, write down in shorthand all changes of climate from moment to moment. Curves of this kind, appealing to the eye, are much more easily understood than tables of figures; besides, they speak a language common to all the world, while, unfortunately, some civilised nations reckon in inches and lines, others in millimetres; some mark their instruments on Fahrenheit's system, others according to Reaumur, others on the centigrade plan. A celebrated physicist becomes quite enthusiastic when speaking of the value of these registers as compared with the most zealous and unwearied human observers. "You can't tire them out," says he. "Monotony is their element, regularity the condition of their existence. Just wind up your observer, and set him going, and there he remains at his post, night and day, heat or cold; his eye is always clear, his hand firm. He never dozes, nor goes off into a brown study. He never thinks, as some unconscientious observers do, of fabricating imaginary observations to fill up the gaps which were made while he was snoozing." In this way not only the temperature, but the electrical condition, the moisture, &c., of the amosphere may be registered, and are registered at Kew and elsewhere. One of the strangest applications of the principle is that whereby Dr. Neumeyer, head of the hydrographic department at Berlin, has been able to photograph both the course of submarine currents and also the temperature of the sea at different depths. A thermometer and a compass, shut up in a brass box, are sunk with the sounding-lead. There is the usual revolving roll of sensitive paper, and the light thrown on it is violet (caused by passing a series of electrical sparks through rarefied nitrogen), and travels down a Geissler's tube. A sort of rudder attached to the box keeps the compass in the line of the current.

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[*] Continued from page 404.

A very simple application of photography has lately enabled Dr. Forel to determine from day to day the clearness of the waters of the Lake of Geneva. The lake, it is well known, is very turbid in summer, very clear in winter, and the change comes on sometimes in a single day. You only have to sink sensitive paper to a certain depth, and then compare the different shades, deeper or lighter, according as the the water is clearer or less transparent. In February you must go to more than a hundred yards to get the same effect which in July is produced at fifty yards.

Even spectrum analysis is helped by photography—dark lines, wholly inappreciable by the eye, are thereby discovered in the violet rays. Some of us have seen a gas-jet vibrating in unison with a musical note, and have been shown how, by catching it in a revolving mirror, the jet may be turned into a scalloped ribbon of flame. This ribbon has been photographed—cyanogen, which gives a violet light, being substituted for common gas. In somewhat the same way the vibration of musical strings may be recorded photographically.

One word about the Autotypes, now so common in illustrated books. All these depend on the fact that gelatine mixed with bichromate of potassium becomes, as it were, tanned by the action of the sun's rays. It is no longer soluble, does not swell in cold water, and takes printers' ink. But where it has been kept from the action of light it swells in water, and will not take printer's ink. Hence a ready mode of procedure. Mix your bichromatized gelatine with any colouring matter—powdered charcoal, for instance—and the parts on which the light acts will retain their colour, while all trace of it may be washed out of the other parts of the mixture. A sheet of paper covered with gelatine and charcoal-powder is first rendered sensitive by a bath of bichromate of potassium. The negative is then fastened on it, and it is ready for use in the camera. To develop the picture, the sheet must be steeped in warm water. All the gelatine will be washed out of those parts which the shadows of the negative have protected against the action of the sun, and which correspond to the light parts of the real object. In this way a positive is obtained, the raised parts of which are hard enough to make an impression on lead or on printers' metal; so that moulds may be taken by simple pressure, if it is not convenient to take them by the usual electrotype process. In this way the perfect accuracy of a photograph is combined with the durability of stereotype. These photographic processes are due to our countryman, Mr. Goodbury. There are also processes called photo-lithography, whereby the impression is worked off more directly from the photograph itself; but these have not yet been brought to perfection. The grease of printers' ink makes it difficult to print directly from the photographic plate, as any one can understand who remembers that the surest way to spoil a photograph is to touch it with greasy fingers.

The camera is a wonderful help to the microscope. It saves the eyes. And nothing is more fatiguing than to use the microscope for any length of time; especially when one has to draw figures of what it discloses. Moreover, two stereoscopic views make it possible to present the magnified object in its natural form, whereas with the unassisted eye it is very difficult to get anything but a flattened picture of it. Lastly, when the microscopic photographs are reproduced in a magnified form, details come out which had wholly escaped the observer. As we found in other cases, the sensitive plate sees things which the eye cannot see, even when helped by the microscope. Of course photography may be, and is, applied to diminish as well as to magnify. You may photograph a folio so that it may be put in a nutshell; nay, if there were any advantage in it, all the books in the British Museum might be so reproduced as to be packed in a chest of drawers.

One thing still baffles the photographer: the permanent reproduction of the colours of the object photographed. We say permanent, for Mr. Becquerel has reproduced them on an iodised plate treated with salts of silver; but neither he nor the others who are working in the same direction have as yet succeeded in fixing the coloured image. You can easily get negatives which will give red, blue, or yellow impressions by interposing respectively a green, orange, or violet screen—those colours stopping the red, blue, and yellow rays—but this is not of very much use; so we end as we began: "Learn photography if you have the chance. Who knows but you may hit upon the mode of fixing the colours of things as we see them?"

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THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

BY THOMAS BOLAS, F.C.S.

Lecture VI.

Other Methods of Producing Photographs in Pigment. Dusting-on Process.—Autotype Printing.

You will remember that, last week, I spoke of the use of india-rubber rollers for the inking of collotype plates, and that I recommended a roller made with a thin surface of red india-rubber on a body of the glue and treacle composition used for typographic rollers. At the conclusion of the lecture, Mr. Dallas informed me that Messrs. Blades, East, and Blades, of Abchurch Lane, have recently introduced into commerce a roller consisting of a thick layer of red vulcanized india-rubber on a rigid stock. These rollers are made under a patent of Mr. Lanham, manager to the above-mentioned firm, and will, I am convinced, prove of very great value to lithographers, as well as to collotypic printers. The manufacturers have kindly lent me some specimens of their rollers, which are now on the table.

Up to the present time, we have been studying the means of producing, by the agency of photography, printing surfaces from which copies might be obtained without any further intervention of light; but in this, the last lecture of the series, I want to call your attention to some methods for the production of pictures in pigment, which necessitate a direct and separate action of light for the production of each picture.

Here is a glass plate, and I pour on it a mixture containing

Glucose	25 parts
Honey	4 ,,
Ammonium bichromate	4 ,,

Dissolved in 120 of water.

I lay the plate on the hot-water apparatus, and it will be dry in a few minutes. If the dried plate is exposed to the atmosphere, it will absorb moisture, and the whole surface will become sticky. Now that the plate is dry, and while it is warm, I will place it behind a transparency, and allow a strong light to shine on it through the transparency. The joint action of light and ammonium bichromate tends to make the honey and glucose insoluble; or, at any rate, it prevents these materials from absorbing moisture from the air, as they tend to do naturally. Let us now take the plate out of the frame, and examine it. A very faint image may be traced thereon, but only those of you who are near can see it. Now, what is happening to this plate? Those parts which were protected from the light are absorbing moisture from the air, the honey and glucose being here unaltered, while those parts which were exposed to the full action of the light refuse to absorb moisture, and those parts which have been protected from the action of a part of the light, absorb an amount of moisture proportionate to the degree of shade afforded by the half-tones of the transparency. Now note the effect of dusting powdered black-lead over the plate, and rubbing it on with a soft brush. Those parts which are dry refuse to take the black-lead, while those parts which are moist hold an amount of black-lead proportionate to the degree of moisture. Now look at our plate, and you will see that there is a picture showing all degrees of light and shade, the picture being formed of black-lead, held by the various degrees of moisture absorbed from the air. The next step is to coat the plate with collodion, and to immerse it in water, in order that the yellow ammonium bichromate may diffuse out. Other pigments than black-lead may be employed, and the pictures may be made on paper or other materials, but the dusting-on process, although interesting as a means of producing permanent photographs, is not worked commercially to any great extent.

We now pass on to the study of a process of much greater importance than the dusting-on method, namely, the so-called carbon process, or the Autotype method. The first step in this process consists in coating one side of the paper with a tolerably thick layer of gelatine, to which a little sugar has been added, together with sufficient pigment to strongly colour the mixture. Here is a piece of the "pigmented tissue," as it occurs in commerce. To it, about three parts of gelatine, and one part of sugar are dissolved in water, and the pigment is added in sufficient quantity. A band of paper is then drawn over the surface of the mixture in such a way as to coat its surface with a uniform layer of the composition. The pigmented tissues are prepared on a large scale by the Autotype Company, and others, and few will care to prepare their own tissue, excepting for experimental purposes.

To make the tissue sensitive to light, it is soaked in a solution of potassium bichromate, containing about three and a-half per cent. of the salt. You see that this piece of tissue has now become quite flaccid from the absorption of the solution, so I scrape off the excess of solution by drawing the tissue over the edge of the dish, take it out, and hang it up to dry. When dry it will be ready for exposure under the negative. Here is some which has been previously dried, and I will put a piece under this negative, and expose to the action of a bright light. In the ordinary process of silver printing, one can watch the progress of the operation, and can easily tell when sufficient exposure has been given. Not so in the case of the tissue, as it undergoes no visible change by exposure to light. Here is a little tin box having a small glass window in its lid, and a strip of sensitive silver paper can be drawn forward under this window. The lid having been shut down so as to press on the strip of silver paper, the tin box is exposed to light simultaneously with the printing-frame containing negative and tissue, and as soon as the silver paper as acquired a certain standard tint or degree of darkness, it is considered that the tissue has had one unit of exposure. The silvered paper is then drawn forward, so as to expose another portion, and so on, until as many units of exposure have been given as the tissue is known to require when exposed under the negative in hand. This is quite easy in practice, as a little experience will enable one to judge how many units of exposure, or "tints," will be required by each negative; and one guide-box, or "actinometer," serves for any number of printing-frames. The tissue which I just placed under a negative has now had sufficient exposure to light; I take it out, soak it in water until it is soft, and then, while it is still in the water, I bring it in contact with a piece of paper which has been coated over with a thin layer of insoluble gelatine, so as to make it impervious to water. The tissue and the impervious paper are drawn out of the water together, and an application of the squeegee now removes the excess of water which remains between the two surfaces, and the exposed tissue adheres to the impervious paper. Let us allow them to remain in contact for a few minutes, in order that the tendency to adhere may become greater.

Bear in mind that the bichromatised and pigmented gelatine becomes insoluble by the action of light shining through the negative, and the depth to which this insolubility extends is dependent on the amount of light which has acted on it. On those parts of the tissue which have been exposed to much light, a thick layer of gelatine is made insoluble, while on those parts which have been exposed to only a little light, the insoluble layer is very thin.

Now, we want to wash away the soluble portions of the gelatine from the exposed tissue, and to leave the portion made insoluble by the action of light, just as in the Woodburytype process; but if the exposed tissue were put directly into hot water, the insoluble image would become undermined by the dissolving away of the gelatine from underneath it, and it would become destroyed for want of a support sufficiently strong to hold it together. You can now understand why the exposed tissue was mounted on a piece of impervious paper, this being intended to hold together the insoluble gelatine image during the treatment with warm water. Here is the tissue which I mounted on a piece of the impervious paper, or single transfer paper. Notice the effect of putting it into a dish of warm water. You see that the soluble gelatine in which the insoluble image is embedded melts and exudes from under the edges of the paper, while the application of a very little force will now enable us to separate the two papers, viz., that on which the tissue was originally made, and the impervious paper on which the tissue was mounted. Under these circumstances, the insoluble image naturally adheres to the impervious paper, or single transfer paper; but it is at present clogged up by some of the soluble gelatine, which must be removed by rinsing with warm water. You see that this soon dissolves away, leaving the image on the single transfer paper. Here it is. This image consists of varying thicknesses of gelatine made insoluble by the joint action of light and a bichromate; but as the gelatine contains a black pigment (carbon), it shows on the paper as a picture in black-and-white. This is the simplest form of the carbon or Autotype process. It is known as the single transfer process, and, as a little consideration will show you, it requires a reversed negative, that is to say, a negative in which the sides of the picture are reversed—left-hand being where right-hand should be, and right where left. This disadvantage is obviated by the so-called double transfer process. According to this method, the picture is not developed on the support which is ultimately to hold it, but on a temporary support, from which it is removed by the application of a sheet of adhesive paper.

Yonder, at the other end of the table, stands Mr. Foxlee, surrounded by carbon-printing materials of every kind, and he has kindly consented to demonstrate the principal phases of the carbon process with some materials and partly-finished prints, for which I am indebted to the Autotype Company. I see that, while I have been talking, Mr. Foxlee has been busy; he has mounted some pieces of exposed tissue on waxed zinc plates, some on collodionized opal glass, some on single transfer paper, and others on a material known as Sawyer's flexible support, and which I shall describe to you directly. To all of these the wet tissue adheres perfectly well: and as the prints are now ready for development, Mr. Foxlee is putting them into trays of warm water. Notice how he strips the paper off as the soluble gelatine dissolves, and how the pictures will gradually unfold when he rinses them with warm water.

I want you now to take notice of the flexible support introduced by Mr. Sawyer, the talented director of the Autotype Works. Its basis consists of hard paper coated with a layer of insoluble gelatine. This is floated on an alkaline solution of shellac, which softens the gelatine on the surface bonds with it, and forms a thin film of varnish over it. When dry, the flexible support is rubbed over with a weak solution of wax and resin in oil of turpentine, in order to prevent the possibility of permanent adhesion between the flexible support and the gelatine picture. The great advantage of this support consists in the fact that the fine details of the gelatine picture are not crushed against a rigid surface in the mounting and subsequent treatment. This will be illustrated further on.

Mr. Foxlee has now finished developing his pictures. Those developed on single transfer paper are finished, as after development they only require rinsing in cold water, a dip in alum solution to harden the gelatine, and then a second rinse to remove the excess of alum. You see that among the single transfer prints which Mr. Foxlee has developed are some very fine large portraits, but Mr. Foxlee makes large prints as easily as others make small ones; he thinks nothing of making them three feet by four feet, or even larger. Now, here are the prints which Mr. Foxlee has developed for double transfer—some on zinc plates, some on Sawyer's flexible support, and others on opal glass. I see that he has a number of pieces of the so-called double transfer paper in a dish of warm water before him. This paper is coated on one side with gelatine, to which a little alum or chrome alum has been added, and when it is put into warm water the surface becomes sticky, but the gelatine does not dissolve. On each of these prints, which have been developed on the various supports, Mr. Foxlee is placing a sheet of the wet and sticky double transfer paper, and after having ensured contact by means of the squeegee, he puts them aside to dry, and when they are dry it will be found that the paper can be easily stripped from the temporary support, carrying the print with it. In order to illustrate this Mr. Foxlee has provided himself with some transferred prints, already dried, and ready to strip from the temporary support. You see that Mr. Foxlee is now stripping the prints from zinc plates; he just inserts his thumb-nail under one corner, and then a slight pull brings the print off. Now he is similarly stripping prints which have been developed on collodionised opal glass. Notice what a fine enamel-like lustre they have. Next, he will separate the prints from Sawyer's flexible support. You see how easily they separate, and if you carefully examine the flexible support from which a print has been separated, you will be able to trace a faint intaglio image of the print, showing how the image sinks into, and is protected by the flexible support. The single transfer process and tissue making are now untrammelled by patent rights; but the double transfer method and the manufacture of Sawyer's flexible support are subject to patents held by the Autotype Company, and licenses for the working of double transfer are granted on almost nominal terms.

Mr. Foxlee will now illustrate to you the method of making carbon pictures on ivory and on artist's canvas. He has developed pictures on the flexible support, and while they are wet he lays them down on the ivory and on the canvas, which, by-the-bye, have been previously prepared with a thin film of partially insoluble gelatine, and makes contact by means of the squeegee. When dry, the flexible support can be peeled off, leaving the print on the ivory or on the canvas. You see that Mr. Foxlee is now stripping the flexible support from some specimens which he has previously prepared. Very beautiful transparency pictures can be produced by the carbon process; it being merely necessary to squeegee the exposed and wet tissue on to a piece of collodionized glass, and after a few minutes to develop in warm water. Mr. Foxlee is now developing some, and when they are finished I will exhibit them to you by means of the magic lantern. The process I have described to you is generally known as the carbon process, it having arisen out of an earnest desire to obtain non-fading photographs; and as carbon is the type of a non-fading pigment, it was naturally used at first, either in the form of a lamp-black or of Indian ink. As time went on, people wanted other tints, and it was considered especially desirable to imitate the purple tint of a gold-toned silver print. This was done to perfection by the use of a mixture of lamp-black, indigo, and cochineal lake, but, unfortunately, the prints so coloured were found to change their tint owing to the fading of the cochineal lake. Attempts were soon made to replace the fugitive cochineal colour by permanent reds, and notably, by madder red or alizarine, but until recently with only partial success, as ordinary madder lakes work mischief in the tissue. Mr. Sawyer has, however, recently overcome all difficulties with regard to the use of alizarine in tissue, and alizarine is now used in all the tissue of the Autotype Company, which imitates the "photographic tone," or series of tints shown by silver prints.

The kindness of many eminent carbon printers has enabled me to show you a splendid collection of prints to-night. The Autotype Company have lent me several hundred of their well-known and admirable productions, ranging in dimensions from four feet high to pin or brooch size. Messrs. Braun and Co., of Dornach, have kindly lent me specimens which are of the first order, and I want you to especially notice the excellence of two untouched portraits kindly lent by the Woodburytype Company. Among the more recent carbon painters we have Mr. Witcombe, of Salisbury, who has sent a very fine collection of small prints, but as they arrived too late to be displayed, I have placed them on the table. You will see over yonder a frame containing some prints made by a process due to Sir Thomas Parkyns. The carbon prints being covered with a film of coloured collodion, very striking effects are produced, imitating moonlight and other effects.

Mr. Le Neve Foster has lent me a carbon print made by Mr. Pouncy twenty years ago, and if you look at it you will see that in detail and delicacy of gradation it is quite equal to the productions of more recent times; and I have here some carbon prints which were made by Mr. Foxlee, nearly as long ago. I should like you to look at these, as they are an illustration of what was done during the infancy of carbon printing.

In these lectures I have not attempted to give anything like a history of photo-typography; I have not even mentioned many important processes. Had I referred to all, the six lectures would have been merely an index to the work which has been done. I wish I had been able to give you more details of the processes described, but you must bear in mind that days rather than hours are required for properly demonstrating the simplest photo-mechanical process, and real working and practical demonstrations can only be given in the quiet of the laboratory and to a very small number of people at a time.

Before you go, I want you to appreciate the help which Mr. Barker and Mr. Debus have afforded me—not only in work incidental to the delivery of the lectures, but also in the work of preparing materials for them. Do not forget also the thanks which are due to Mr. Foxlee, for his admirable demonstration of the carbon process.

FIRST IMPRESSIONS OF THE ECLIPSE OBSERVATIONS.

The conclusions derived from the recent eclipse observations are in curious opposition, in some points, to those derived from former observations. Summarising the recorded views of different observers. The *Scientific American* says :—

" It is of course too early to expect any strictly scientific or conclusive estimate of the bearing of the eclipse observations on current solar theories, there having been no opportunity for a critical study and comparison of the photographs and other records obtained. Yet the impressions made upon the observing astronomers by the more striking phenomena are not without interest. How far the dissimilarity of the results from those obtained at previous eclipses is to be attributed to the markedly quiescent condition of the sun's atmosphere at this time, how far to the circumstance that most of the observations were made through the thin clear air of high rocky mountain regions, and how far to hitherto unsuspected changes going on in the sun, remain for solar experts and future observations to determine.

" As regards the constitution of the corona, the results, Dr. Draper says, were entirely unexpected. Owing to the absence of great eruptions on the sun, that observer concludes that a true or normal spectrum of the corona was obtained for the first time. Consequently the luminous gases formerly discovered therein, particularly that giving the bright green line 1474, must have been temporary or accidental and not essential elements of the corona. His spectrum photographs showed that the light of the corona was derived solely by reflection from the sun. Prof. Barker's analyzing spectroscope bore the same testimony, as likewise did Prof. Morton's observations with the polariscope.

" Touching the effect of the varying constitution of the corona, Dr. Draper said to the *Herald* correspondent.—

" ' It is rather singular while the sun has been in such a quiescent condition for more than two years that we have not seen more changes in the climate of the earth. This would seem to show that the abnormal condition of the sun at the maximum period of sun-spots, which occurs every eleven years, counts for but little against the total amount of heat that is sent out from the sun at all times. The present observations go to show that the activity or quiescence of the sun makes no perceptible difference in the earth's condition. I do not regard this most marked change in the corona as portending any change in the condition of either climate or crops.'

" Mr. Norman Lockyer interprets the evidence very differently, He says: ' The present eclipse has accomplished, if nothing else, the excellent result of intensifying our knowledge concerning the running down of the solar energy With the reduction of the number of spots or prominences for the last four years, the terrestrial magnetism has been less energetic than it has been for the preceding forty years. This would evidently account for it, as well as for the great famines in India and China which took place forty-four years ago. The sun is the great prime mover of earth. Every cloud, every tide, every air-current depends upon it. Its present quiet condition indicates great heat on earth. When in a state of activity the sun throws out an atmosphere which serves as a shield to the earth, protecting it from abnormal influences of the sun. The absence of the green lines shows a great reduction in the temperature of the sun, and such a marked change in the sun should produce a corresponding change on the earth. A continuation of this changing of the sun's condition must inevitably be followed by serious results and radical climatic variations.'

" President Morton says that the marked changes in the sun's condition would seem to call for corresponding marked changes in the condition of the earth, and it is a surprise that no such changes have occured.

" He is of opinion, however, that the evidence tends to sustain the theory that the sun's heat is maintained by the impact of meteoric matter, which is known to vary largely in constitution, and it is possible that the sun's fires may be fed at times with purely mineral matter, and again for considerable periods with meteorites highly charged with hydrogen, giving the sun a far-reaching atmosphere of the ignited gas. ' If such changes go on indefinitely it may not be irrational to inquire whether they may not in future produce such extraordinary climatic conditions in the earth as geology teaches us have existed in the ages of the past, or, in other words, the polar regions become tropical, as the fossil remains of animals animals and plants found there indicate they have been.'

" Mr. Cowper Ranyard, while recognizing the marked changes in the sun's atmosphere, does not anticipate any great effect from them on that of the earth. Prof. Young agrees with Dr. Draper and the rest in thinking that Mr. Lockyer exaggerates the effect of coronal changes upon the earth's climate. So apparently, does Prof. Newcombe who does not expect from the results obtained any upsetting of well-founded current theories, or the establishing of any strongly-based new ones."

DIRECT POSITIVE PROCESS.*

Herr Pillet produces by means of this process dark images upon a white ground, which may hereafter be strengthened or tinted by hand. The process rests upon the liability of chloride of iron to decompose in light when it is changed into the sub-chloride. The latter salt is not acted upon by a solution of red prussiate of potash, while the chloride at once becomes blue on treatment.

The paper on which the print is to be secured is prepared by dipping into a solution of—

Water	30 grammes
Chloride of iron	3 „
Oxalic acid	1·5 „

The oxalic acid may be replaced by an equivalent of another similar organic acid. In the event of the paper not being properly sized, a little dextrine may be added to the bath. The paper is dried in the dark, and may be kept for an indefinite time without losing its sensitiveness.

In order to reproduce a design, sketch, or drawing of any kind, it is simply necessary to place the same upon a sheet of this sensitized paper, and cover the whole with a glass plate.

The printing is very rapid, for in summer only thirty seconds are necessary for exposure, and in winter from forty to seventy seconds in the sunshine. In shade, a much longer time is, however, required. From four to six minutes suffice in fair weather; but on a dark, dull day, sometimes forty minutes are necessary.

The electric light has been found to act very vigorously; the time of exposure depends upon the distance from the light, and the density of the original drawing or cliché.

After exposure, the plate is dipped into a solution of—

Water	500 grammes
Red prussiate of potash	80 „

This colours all unchanged portions of the surface blue. The print is then washed in plenty of water and fixed in a solution of—

Water	500 grammes
Pure muriatic acid	50 „

Finally, the print is washed and dried.

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* *Photographisches Wochenblatt.*

The Photographic News.

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RED FOG DURING INTENSIFICATION.

The return of hot weather generally brings the photographer a series of troublesome experiences, from which, during the prevalence of a moderate temperature, he is free. Amongst the most troublesome is the recurrence of red fog on the shadows of the negative during intensification. As the red stains are very opaque to light, they ruin the negative, which it provokingly often happens is a good and important one. It often occurs when least expected. The deepest shadows suddenly show some signs of deposit, and before it is possible to stop operations, and wash the plate, a decided deposit of a red or coppery hue has taken place. This occurs chiefly after developing with iron, whilst strengthening by means of pyrogallic acid and silver. It occurs both when the process of intensifying is applied before fixing, and after fixing. It differs from general or universal fog in occurring, not all over the plate, but in patches, on the deepest shadows first. The occurrence of this deposit is generally much more common with a collodion giving a somewhat spongy or absorbent film, than with one giving a horny film, and the deposit appears to be caused by the spongy film retaining, whilst intensifying, some traces of the preceding solutions which had been applied. We are uncertain of all the causes which produce this; but we can mention some of them, and we can point out a remedy. Great heat is a common cause, and it is for that, as well as other reasons, desirable to keep the dark room as cool as possible during hot weather. The use of an old bath, or one containing organic matter, aids in causing this trouble. It is often induced by the film having been imperfectly washed after developing with iron, before applying the pyro and silver: the remedy in that case is simple and obvious—a more thorough washing before commencing to intensify. It is very often caused by the use of the bath solution for the purpose of adding to the pyro. This, especially when the bath is an old one, is a very common cause. We have always found that a twenty-grain solution of the purest nitrate of silver was the best for intensifying, and gave much more satisfactory results than when a few drops from the bath were added. Prolonged application of the pyro and silver, when density appears tardily, especially if there be any trace of chemical light in the room, will also cause this trouble. The free use of citric acid in the intensifying solution of pyro and silver, instead of acetic acid, will sometimes prove a remedy. The usual proportion of citric acid used is one grain to two of pyro. For this purpose the proportion may, in hot weather, be largely increased with advantage, in some cases to equal proportions of each.

The remedy we have found unfailing, consists in the application to the film, after developing with iron and washing, of a solution of iodine. This may consist of an alcoholic tincture of iodine added to water, until it is the colour of brown sherry, or iodine with an equal proportion of iodide of potassium dissolved in water, say one grain of each to an ounce of water. This solution is poured over the film, and in a few seconds washed off; the solution of pyro and silver is then applied, and in our hands, and in the hands of all whom we know to have tried the plan, it is found that the intensification proceeds satisfactorily, without any tendency to the red deposit on the shadows, or any other form of fogging.

This red deposit on the shadows also occurs whilst intensifying after fixing, and occurs most frequently with a spongy and absorbent film. It also generally happens when the intensifying is conducted in the light, or when the plate has stood in the light after fixing and before intensifying. This deposit, in many of these cases, arises from the retention in the absorbent film of some unsuspected traces of cyanide of potassium holding in solution cyanide of silver, which has been acted upon by light, and forms the nuclei for reduction, when the intensifying solution of pyro and silver is applied.

Cyanide of silver is very readily acted upon by light, and any traces remaining in the porous film will readily become a source upon which abnormal reduction readily takes place. The preventive in this case, in addition to other precautions already named, is a very perfect washing after fixing, before applying the intensifying solution.

When the first trace of this deposit appears, the plate should be quickly washed, and, by the judicious use of cyanide, the deposit may be removed. If it be necessary to proceed further with the intensifying, it is important that a most thorough rinsing, and sometimes an application of the iodine solution, should be given before proceeding further with the pyro and silver, as the tendency, once evinced, is very persistent, and will probably occur again at once on attempting to intensify further.

The best remedy which can be applied, when once the evil is in existence, and cannot be removed by cyanide without endangering the picture, is to treat the plate with a dilute solution of bichloride of mercury, which will not affect, in any appreciable degree, the general image, but will convert the red deposit into a thin one of bluish white, through which the light can easily pass, and will, therefore, render the defect of comparatively small importance in printing.

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THE LONTIN ELECTRIC LIGHT.

London residents and visitors to the metropolis have now an opportunity of estimating the value of the electric light as a source of illumination. As we recently remarked, it is used every night to light the Strand in the neighbourhood of the Gaiety Theatre. A comparison of the extent and quality of the illumination as compared with the street gas will interest photographers. The *Times* gives the following details:—

"The electric light chiefly known to English visitors to Paris is the Jablochkoff candle, which displays its beautifully white glow from opalescent glass globes placed at a great height along the Avenue de l'Opéra, and among the trees of the Orangerie. There is, however, another electric light used in Paris by the Chemin de Fer l'Ouest, for example, which has just adopted the Lontin system for lighting the Gare St. Lazare, the station at which the traveller by the Newhaven and Dieppe route enters the French capital. The Lontin light is now exhibited in London outside the Gaiety Theatre, and by comparison with its pure white radiance the gas lamps of the Strand appear to burn with a dull yellow glare. So far as the illumination of open spaces, streets, and houses is concerned, the future, supposing gas to be to a certain extent superseded, appears to lie between the Lontin and the Jablochkoff light. The Siemens light has proved of great value for the purposes of lighthouses, where great intensity is desired. For ordinary uses, however, the problem is to moderate, not to increase, the intensity of the light. The Jablochkoff and Lontin lights have many points in common, and, as the former light has already been described in our columns, it is unnecessary to enter into all the details of this method of illumination. The points of importance in each are the generation of the electricity by a machine, the distribution of the current, and the supply and regulation of the "candles." To the Jablochkoff lights the electrical force required is supplied by a gramme electrical machine. The Lontin light is worked by a machine invented by M. Lontin himself. It produces at will a unique current or multiple currents, direct currents, and inverted currents. These can be distributed on several circuits. A great advantage in distribution is thus obtained. The machine produces several focuses of light, which can be entirely independent of one another. With a single machine 36 lights have already been produced. The motive force employed to produce a light equal to 100 Carcel burners is half a horse-power. A Carcel burner is a conventional measure, the standard of which is a Carcel lamp burning 42 grammes of purified colza oil in an hour. The electric force having been produced by the Lontin machine is conducted towards the "candles." In 1813 Sir Humphry Davy took two hot coals, put them in contact, and made a voltaic current pass through them. He then slightly separated them, and saw between them a bow of fire, which he called the electric arc. The "candles" of the Jablochkoff and Lontin lights are sticks of carbon representing the coal used by Sir Humphry Davy. M. Jablochkoff employs kaolin in addition to carbon in a very ingenious manner; but the main superiority which the modern manufacturers of electric lights have over Sir Humphry Davy is in the superior economy with which electric force is now elicited. The carbons are vertically placed, one above the other, in the Lontin light as in that of M. Jablochkoff. The light comes not only from the electric arc between them, but also from the carbon candles themselves, which become incandescent, and are consumed. A clock-work regulator advances them as they waste away, and it is stated that to such perfection has this contrivance been brought that for a week or more the lights at the Gaiety have required no adjustment during the four hours for which they burn every night. Having once been set, the regulator has each night advanced the points without any aid from men. At Paris little accidents are not unfrequent with the electric light. The Avenue de l'Opéra is occasionally left in sudden darkness by some *contretemps*, and anything which renders this result unlikely to happen is, of course, an improvement. A Lontin light exhibited in experiments at the Paris Exhibition has remained luminous for 21 hours. The Lontin regulator, and the Lontin machine are, it will have been seen, the speciality of this invention.

"The lights at the Gaiety are worked by a steam-engine in the *Echo* office. For the display of the light as a novelty in a shop window a small gas-engine would probably supply sufficient motive force to bring the Lontin electro-magnets into vigour. The wires which convey the current pass under the road to the theatre, and might be prolonged to Charing Cross, for instance, and Covent Garden Theatre, so that all three points could be lighted at once by the same machine.

"The advantages which this, like the other systems of electric lighting, possesses over gas, have been summarized as follows:—Gas emits a fetid odour; the electric light is without smell. Gas may occasion explosions and fires; the repairing of the pipes is often difficult; great heat is developed together with the light; the flame is always coloured even when gas has been completely purified. In the transmission of the electric light the pipes are replaced by wires; the voltaic arc diffuses very little heat (the hand may be held with impunity twelve inches above the Gaiety lamps), and the light attained is white, perfectly compounded of all the colours in the spectrum, like sunlight. Indeed, it is so white that spinners and dyers can utilize it for sampling their stuffs. It may be added that the appearance of the lamps, when sufficiently roughened glass, is used is very beautiful."

PREPARATION OF MAPS, PLANS, AND DRAWINGS FOR PHOTOGRAPHING.

BY CAPTAIN WATERHOUSE, B.S.C.*

(*Assistant Surveyor-General of India*).

Preparation of the Original Drawing.

I have already adverted to the difficulty that has been found in this country and elsewhere in obtaining original drawings suitable for reproduction by photo-zincography, and to the fact that without a proper original drawing it is quite impossible to produce satisfactory results. Besides its principal use in reproducing maps of the surveys, photo-zincography is very largely utilised in India by engineers for the reproduction of their plans and drawings, and by other public officers for an immense variety of miscellaneous maps and plans, and as we were constantly asked to photo-zincograph subjects utterly unsuitable to the process, a set of rules for the preparation of the original drawings for reproduction by photo-zincography was drawn up under General Thuillier's direction, and published in the official Gazettes all over India, and the result has been a great improvement in the execution of the drawings we receive for reproduction.

The rules are as follows:—

1. All drawings should be on white, smooth-surfaced paper, free from dirt, pencil marks, creases, and wrinkles. When possible, they should remain stretched on the drawing board.

2. The Indian ink should be freshly rubbed down, and give good *black* lines, free from glaze.

3. The lines should be firm and cleanly drawn—not too fine or too close together. They must be quite *black*, and light effects must be produced by fine and open black lines, and never by the use of *pale* ink, Thick lines in the printing and borders of maps should be well filled in. Pencil marks should be carefully removed, so as not to injure the blackness and firmness of the lines.

4. All cross-hatching and shading should be as open and clear as possible, and the lines composing it firm and not too fine. Intensity of shade must be shown rather by an increase in the thickness of the lines than by placing them closer together, in order that the intermediate spaces may not become blocked up when transferred to zinc. It is better not to rule the shading of mechanical and architectural section drawings, but to show the shaded parts by a light tint of blue, violet, or *aniline* red (fuschine or roseine). These parts will reproduce white, and can have a ruled tint transferred on the stone or zinc in the usual way, which will give a much neater appearance.

5. In plans or drawings intended for photo-zincography, *washes* of any colour—except very pale blue, violet, or aniline red, are absolutely inadmissible. Outlines may, however, be drawn, if necessary, in any strong red, brown, yellow, orange, or green pigment, which will reproduce black. Any details to be shown in the original, but not in the copy, may be drawn in pale blue, violet, or aniline red. Details that are not required to be reproduced, may be painted out with Chinese white.

6. River courses, lakes, and tanks should be left blank, and not filled in with fine lines. They may be indicated by a pale wash of *blue*, without detriment to their reproduction.

7. When drawings are to be reduced, care must be taken to draw the lines, lettering, and detail of sufficient thickness and size relatively to the scale of reduction, so that they may not be lost or illegible when reduced. Sufficient

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* *Journal of the Asiatic Society.*

space must also be left between the lines to prevent subsequent blocking up.

8. When possible, drawings should be made on a larger scale than they are required to be copied. Photographic reductions are always sharper and firmer than reproductions to the same scale, and defects in drawing are lessened by reduction.

9. Where plans or drawings to scale are to be reduced, the scale should be given in terms of a single unit of measurement, and not as relative to any second unit. Thus, the scale on a map drawn on the scale of four miles to an inch for reduction to sixteen miles to an inch, should be shown simply as a "scale of miles."

10. As photography produces a more or less perfect facsimile of the original drawing, it is essential that drawings intended for publication should be complete and finished in every respect before they are made over to the photographer. The drawing, printing of names, &c., should be in as neat a style as possible, and not require to be altered or touched up. The hair-strokes of the printing should not be too fine.

The foregoing rules may be summed up in a few words. *White paper, black ink, and firm open drawing;* and, as success in the after processes depends entirely upon the perfection of the original drawing, and its capability of giving a negative on which the ground is perfectly opaque while the lines are quite clear and as transparent as the bare glass, these essentials must be most carefully observed. Their neglect will entail failure and disappointment.

For drawings intended for reproduction by the collotype methods these rules are equally applicable, especially No. 7, and there is even more necessity for perfect cleanliness of the paper and neatness and finish of the drawing, because the faintest tints will be reproduced by the gelatine printing surface, and corrections cannot be made on it as they can on zinc, stone, or copper. For this reason, also, the greatest care must be taken to complete the drawing in every respect before it is given to be reproduced. Drawings in line may be finer and more delicate than for photolithography, but still must not be so fine as to interfere with the obtaining of a perfectly dense and opaque negative, otherwise the ground of the print will appear dirty and stained. Pale ink may be used when necessary for effect, but not more than is really requisite. Colour may may be used to any extent, having always due regard to the photographic effect when reproduced. On account of the difficulty of photographing certain colours so as to produce the same effect as in the original picture, the best results will be produced from drawings specially prepared in monochrome—such as Indian ink or sepia.

In the case of drawings for any special purpose, or not intended for publication, the above rules may be relaxed; but the general principles laid down should be observed, as far as practicable, if the best results are desired.

When drawings are prepared specially for photographic reproduction, there need be no difficulty in taking all the precautions necessary for producing good results. It often happens, however, that the photographer is called upon to reproduce drawings, lithographs, or old MSS., printed records, or engravings, which either may never have been suitable for the purpose, or, if suitable when fresh, have become dirty and stained by age. Herr Scamoni, the skilful Chief of the Photographic Department of the Imperial State Paper Office at St. Petersburg, has given some useful hints on the treatment of such subjects under these circumstances.*

"Yellow, or otherwise objectionable, spots should be carefully covered over in the spaces between the lines with Chinese white, and, whenever possible, the lines should be strengthened in parts where they appear weak.

"Lithographs and engravings may be bleached by immersion in a solution of chloride of lime, or *Eau de Javelle* (one to ten or fifteen of water), then soaked in water for some hours, after which they are treated with a weak solution of hyposulphite of soda, and finally well rinsed in clean water.

"Fresh grease stains may be removed with chloroform, benzine, and ether, or with a weak alkaline solution of caustic potash or its carbonate.

"Old grease stains may be removed with a more or less strong solution of potash, applied at the back of the subject.

"Iron mould and ink spots may be taken out with a solution of oxalic acid or salts of sorrel."

When tracings are made on paper or vellum cloth to be reproduced without the aid of the camera, special care must be taken to keep the back of the drawing clean, and to choose paper or cloth free from stains, and of as even a texture as possible.

Originals drawn on rough paper may be smoothed in a copper-plate press, and, if dirty, should be carefully cleaned with india-rubber or bread.

◆

M. LIEBERT ON PORTRAITURE.*

If a study of lighting is indispensable to render justice to the expression of every face, and put in relief all that may be of beauty in the human face, the choice of a suitable pose is not less important in order to secure a good likeness.

To make a portrait means to represent an individual in his habitual attitude. It is necessary, therefore, that the pose chosen is that which is the most characteristic of the subject to be represented.

The first condition is that the attitude should be a good one; that it is in harmony with age, statue, contour, and habits of the individual in question. In the second place, the pose should represent the model at its best. For this reason a studied attitude must be avoided, as well as any stiff or formal one, which sometimes overcomes the sitter when placed opposite a camera. It is necessary to observe the model, and assist him in assuming a position natural to him, and, moreover, to distract him as much as possible, so that he may not be forever thinking of the fact that he is having his portrait taken. It is in this way that one gets at last to take nature by surprise, as it were, and to secure a confiding and intimate expression, instead of the conventional portrait which, no doubt, give the features mathematically correct, but lacks all life and animation. It is a living being one desires to have a representation of, and not a cold inanimate statue.

The great difficulty, nevertheless, is to choose an expression which accords best with the *ensemble* of the portrait, for, according to the pose and attitude of the body, the expression of the face will give a more or less correct character of the individual. As soon as the right sort of expression has been observed, then every effort, by means of conversation, &c., must be made to maintain that expression on the face of the sitter.

Changes in the expression are so rapid and so fugitive that it is very desirable to secure them as instantaneously as possible upon the collodion plate. Unfortunately, in the studio, this is impossible; it becomes necessary, therefore, to refresh and re-animate the expression during the pose, a matter which does not present insuperable difficulties. The result is obtained by conversing with the model, and in giving rise to sentiments which one desires to see reflected in his visage. It is not by employing cold and formal cautions, nor by the warning "Now Don't Move," which have a more or less disagreeable effect upon nervous people, that a natural and true expression is secured, for one cannot call up pleasant features and lines by word of command. It is only when one feels at one's ease that this is shown in the face. It is necessary to identify oneself in some way with the model, and in this way give rise to sentiments within the latter which shall call forth the expression you desire, and which appears to you to accord with his pose. It is in this way that the photographer produces a work of art, and becomes an artist.

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* *Handbuch der Heliographie*, p. 67.

* From *Traite Complete de Photographie Practique.*

To secure a good result it is very important that the photographer should be alone with his model, for the least distraction is to compromise the success of the operation. Many ask their sitters to smile, and to remain perfectly motionless, looking at some fixed point—a reason why so many portraits are ugly and unlike, for the sitters wear a sad grimace, the result of muscles being kept at tension. In others there is a fixed or vacant look which proves that the photographer has in no way been able to control the expression of his sitter.

A question of equal importance in connection with the true rendering of a portrait are the dimensions—or, rather, the proportion of space—which the model shall occupy. A large and powerful man should obviously occupy more space and appear bolder on the picture than a small and delicate individual. It would be absurd, for instance, to let a child occupy the same space as a full-grown man of six feet; the child would appear an infant-prodigy, and the man a dwarf. The corpulence of the model may be taken as some sort of guide, and the accessories, it should be remembered, must always be in harmony with the character of the models.

In the case of standing portraits, the individual will always appear greater the less sky there is about him and ground under his feet, the surroundings of a portrait thus having considerable influence upon the apparent proportions of the model.

Generally speaking, three kinds of portraits are made in photography. Full-length, half-length, and bust pictures. The full-length is that which gives the most complete likeness, for we have the individual here complete, in his ordinary position, and in proper proportion. This class of portrait, is, however, the most difficult to execute, whether in respect to securing a likeness or harmonious picture; the placing of arms and legs, and studying to secure proper equilibrium, all add to the difficulty.

Sitting-portraits, in which the whole of the sitter is shown, do not offer less difficulty because of the imperfection of the lenses with which we have to deal, and which are prone to exaggerate and deform. Legs or feet extending forwards are among the main difficulties to contend against, and the aim of the photographer always is to secure all portions of the sitter being as nearly as possible in the same plane.

◆

INK PRINTING FROM GLASS NEGATIVES.

BY HANS BRAND.*

To make negatives capable of being printed from, they must be coated with a solution of chromatized gelatine, but only after they are perfectly dry. By this means a layer of chromatized gelatine is deposited over the collodion film. But it is well known that when such negatives are exposed in diffused light the lines become broader than they should be, because the light, even with thin films, can act sideways. In order to obviate this I tried to form a film of chromatized gelatine in that of the collodion negative, and I was fortunate enough to be completely successful. The method that I adopted was to fix the negative immediately it was taken, without first drying, then to wash with water, and while still wet to immerse it in a dilute solution of chromatized gelatine. When dry, the surface was quite dull, without any sign of gelatine upon it; the collodion film had, notwithstanding, absorbed sufficient chromate and gelatine to be capable of printing from after-exposure.

The best method of obtaining these plates with what may be called a typographical collodion film is as follows; First take an ordinary but not an intense negative on an albumenized plate glass plate, fix it at once, wash it, and then plunge it into the gelatine solution, which should be prepared in the following way; four or five parts of gelatine are allowed to soak and swell up in water, the excess of fluid is poured off, and the remaining gelatine dissolved in fifty parts of distilled water. Then a solution of five to

Ammonium bichromate	5 parts
Water	100 ,,

are added, and the whole is heated 75° C. In this bath the plate must remain for about five minutes. When large plates are used, the solution may be flowed over them, taking care to wash them rapidly with warm water beforehand. In this case, too, it is necessary to repeat the coating with chromatized gelatine several times. After the plate has taken up a sufficient quantity of the solution it is placed in a horizontal position and heated over a spirit lamp. Should fumes come off, the plate must be held upright for a minute or two, and again laid horizontal, and further heated until it is quite dry. It should not be made hotter than the hand can bear when passed over the reverse side.

For negatives of this kind the time of exposure cannot be accurately determined by the eye, nor can it be measured by the ordinary photometer. I overcame this difficulty by first well wiping the prepared negative on the reverse side, and then laying on the film side a small piece of albumenized or chromatized paper, exposing the whole in a frame on the reverse side to the light. By aid of this simple expedient the action of the rays of light can easily be watched, so that places which are too dark can be covered, and all the other articles used which are common in silver printing. Commonly a black support is employed to avoid the reflection of light; but in this process, as I have described it, reflection need not be feared, notwithstanding the white albumenized paper, for the silver chloride absorbs all the rays of light.

As soon as all the finest lines of the image are distinctly visible, the ammonium chromate must be washed out by dipping the plate into cold water; the plate can then be dried, and placed in the hands of the printer. The finest rollers must be used for printing. When the plate is damped I would recommend that a little gum arabic be dabbled on the edge, and rubbed over the surface of the picture. As regards the production of the negative, I should observe that it is not every collodion which will take up the chromatized gelatine; there are collodions which will not absorb the gelatine at all, so that a layer of chromatised gelatine merely is obtained on that of the collodion. The lithium collodion, prepared by Kurz, of Wernigerode, is best adapted for this purpose. Probably the litheum salt in this collodion plays no unimportant part in the reaction; but I have not had an opportunity of making experiments on this point.

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HESLER'S PROCESS FOR SOLAR PRINTING BY DEVELOPMENT.

BY A. HESLER.*

The inclosed formula is among the oldest published, and has often been placed before the readers of photographic publications. I believe there is none better, if properly worked, and will try to make the way to good results plain to those who wish to make enlargements easy.

To Prepare Paper.

Skimmed milk	½ gallon
Acetic acid, No. 8	3 ounces

Stir, and put it in a porcelain dish; bring to a boil, stirring all the time; strain out the curd through muslin (make Dutch cheese of this); take the serum, when cold, filter until clear. Now add

Iodide of potassium	16 grains
Bromide of potassium	4 ,,

to each ounce of the clear serum. Float your plain paper on this until it lays smooth; see that no bubbles or spots rest on the paper; dry with moderate heat; prepare the paper in a room free from dust or actinic light, and if kept in a cool, dry atmosphere, it will keep in good working order a long time.

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* *Scientific American* from *Photographische Correspondenz.*

* *Philadelphia Photographer.*

To use, float two minutes on a solution of

Silver	640 grains
Water	16 ounces
Acetic acid	2 „

Draw the sheet off the silver solution over a glass rod. Having previously focussed your picture, place your paper, while damp, in position, and let on the light; print according to the density of the negative. A very hard negative requires printing until the detail is well out, and developed with a very weak developer; on the contrary, a very thin negative need not show any detail, and must have a stronger developer, which is prepared as follows:

Pyrogallic acid	90 grains
Water	32 ounces
Acetic acid	2½ „
Citric acid (saturated solution) ...	10 drops

This is for medium, or good for printing contact negatives. This class of negatives is what is required for making enlargements by development. For hard negatives, use less pyro; for weak, such as regular solar negatives, use more pyro. The old rule was to swab on both the iodizers, and the silver; but in that way you are pretty sure to get streaks and stains in about half or more of the prints you try.

In developing, lay the paper, face up, on a clean board, on which a clean piece of white bibulous paper is laid. Have the developer in a wide mouth bottle. Commence at one end, and apply enough with one sweep of the hand to completely cover the print; now watch it grow. If stains or fog occur, either you have overtimed, or allowed actinic light to get at the print, especially so if the picture pops out quick, and then blackens all over. If it comes up slowly, and stains from this cause, add more citric acid. As soon as developed, plunge in clean water, and from that to the hypo, for clearing, of usual strength; then wash as usual. Thick paper needs longer and stronger cleaning than thin. If the print comes up too flat in developing, add a little acid silver solution to the pyro.

MORA.

Many of our readers are familiar with very picturesque Cabinet Portraits, chiefly of pretty girls often with Rembrandtesque lighting, with a boldly-written facsimile-autograph "Mora" of New York. Mr. E. K. Hough gives, in our Philadelphia Contemporary, details of a visit to Mora's Studio, which will be read with interest. He says:—

"On one of our rainy days in June, being on business near Mora's gallery, 707 Broadway, N. Y., I stepped in to see what he might have new in pictures, as I always like to when I have opportunity.

"I found Mr. Mora disengaged from his regular business, having made arrangements for a visit of two or three months to London and Paris, mostly for recreation, but partly to provide for a more extended sale of his 'Publics,' as his published portraits of celebrated people are called. He was selecting from his stock samples to take with him. His stock was contained in six large cases, eight drawers in each case, eighteen divisions in each drawer, each division capable of receiving about four dozen imperial size; and all the divisions nearly filled. From these the regular orders are selected, and into these each day's work is assorted. Nearly one whole case was devoted to Miss Maude Branscombe. In reply to my remark about so many of one person, Mr. Mora informed me that they had sold over thirty-five thousand of her portraits, and were constantly receiving orders; and that he had made over three hundred negatives of her, and expected to make yet others.

"Further in the conversation he informed me they had sold over three hundred thousand 'Publics' during the past year, and that this part of his business was constantly extending, and quite profitable, as he was enabled to fill up all the time to advantage, many of his most successful Public negatives having been made on hazy and cloudy days, when private custom is usually dull; as people generally cannot be divested of the idea that the brighter the day, the brighter will be the picture. The aggregate business of the past year was over ninety thousand dollars, which, considering the hard times, and the fact that only about five years ago the name of Mora was not known in photography, may be called a pronounced success.

"And it may be worth while to consider the ways and means used in reaching the foremost rank so rapidly; and yet more so, that it has been by none of the established cut-and-dried photographic fashions. Although at first the strong influence of his celebrated instructor[*] was somewhat visible, Mr. Mora's genius was too original not to assert itself with marked individuality. He soon found his own methods and followed them. He has never exhibited for premiums in the usual patent-machine style, then advertised in handbills and placards the wonderful fact that he, among a hundred others, had got a medal. His advertising has all been done with the pictures he has made. Large and beautiful frames filled with fine and varied examples of his style may be seen in the best hotels and theatres all over the country, at all the large watering-places, wherever the best people congregate, and they are thus invited to judge for themselves the quality of his work. That their judgment is favourable his success is the best evidence.

"His gallery is very plainly furnished, with nothing for glitter and show, nothing to distract the attention from the few finely-finished and tastefully-mounted pictures which are negligently scattered about his large reception-room, the colours of which are all quiet, the walls being simply painted a dull maroon colour, as the best foil to the bright pictures, while the plain furniture is all in keeping.

"His operating-room, with its low, broad light, its rough, uncarpeted floor, and its stained walls, is not nearly so fine as many a gentleman's stable, but it has everything that is needed for the production of elegant and artistic photographic effects. There are a few pieces of rich furniture, and a piece of loose carpet as accessories for interiors, with a multitude of backgrounds, screens, profiled slips, fireplaces, window sets, balustrades, steps, rocks, &c.

"He has more than fifty painted backgrounds, representing sea and sky, plains and mountains, tropic luxuriance and polar wastes; every style of scenery from Egypt to Siberia, mostly designed by himself, and all executed with Seavey's unapproachable knowledge of photographic needs. These grounds hang against the wall compactly, without feet, and when needed are lifted out and attached to feet readily, by the use of the ordinary dovetailed bedstead castings.

"There could be much more useful description given, but this article is already too long, and I will close it with the emphasis of one fact that must be interesting to photographic workers everywhere. Mr. Mora's rapidly won success has been achieved through photography, with only its pure and simple light and shade. There has never been a painted photograph made in or sold from his gallery. And I think there is not another instance on record of a gallery reaching a business of nearly one hundred thousand dollars per year, that has been able, even if it has tried, to resist the seductive promise of easy profit from coloured work. He has resolutely continued to turn away thousands of dollars worth urged upon him, although not one coloured picture has ever been exhibited in his gallery.

"Can there be any better evidence that Mr. Mora's success is not the result of fortunate chance, but the outgrowth of a well considered plan of action, based upon the natural promptings of an instinctive artistic taste? And what can be more encouraging to photographers than such positive proof of the noble results which can be drawn from plain portrait photography in energetic and artistic hands."

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[*] Sarony.—Ed. P. N.

DRY PLATE PROCESS OF M. ANDRIEUX.

In the *Moniteur de la Photographie* appear the details of a dry plate process, given by M. Maurice Andrieux. They are as follows:—

"After the glass plates have been covered with gelatine by plunging them into a solution of white gelatine, made up of water 1,000 parts and gelatine 2 parts, they are dried.

"The collodion is prepared with—

Ether	300 cub. cents.
Alcohol at 40°	75 ,,
Pyroxyline	4 grammes

Of this pyroxyline, two grammes should be of pulverulent cotton, which is of a porous character, and two grammes of a resistant cotton, which adheres more tenaciously to the glass plate. To 100 cubic centimetres of this normal collodion, fifteen to twenty-five of the undermentioned iodizing solution is added:

Alcohol at 40°	100 cub. cents.
Iodide of cadmium	8 grammes
Bromide of cadmium	6 ,,

"The collodion is very transparent. The silver bath employed should be of eight per cent. strength, and slightly acid; the plate is permitted to remain in the bath for three to five minutes, until all appearance of greasiness has disappeared.

"After carefully washing in water, the film is covered four or five times with tannin, or better still is it to employ two vessels with the tannin solution, the first, so to speak, to remove the water adhering to the plate, and the second of full strength. The tannin solution is composed of—

Tannin	3 grammes
Filtered water	100 cub. cents.
Gum-arabic	1 gramme

"The plate is allowed to dry completely before it is used, being stood to drain upon filter paper. Put away in a plate box (in the dark), they are ready for use at any time.

The period of exposure varies from fifteen seconds in the sun to forty-five seconds in the shade, with an apparatus for landscapes of twenty centimetres focal length, and a diaphragm of twelve millimetres.

"To develop, you prepare the undermentioned solution.

"Transparent sesqui-carbonate of ammonia; that is to say, it must not be used as usually met with—in an opaque condition. If only the latter is to be had, the outside is scraped off, and the inner transparent part only employed. Of this salt a saturated solution is made, and to every 100 grammes of solution are added 10 grammes of alum. This constitutes No. 1 solution.

"No. 2 consists of—

Alcohol at 40°	100 cub. cents.
Pyrogallic acid	10 grammes

"No. 3—

Filtered water	100 cub. cents.
Bromide of potassium ...	2 grammes

"To develop one's plates, there is taken filtered or rain-water 100 cubic cents., to which is added 2 cubic cents. of solution No. 1; further, 4 drops of solution No. 2, and, again, 4 drops of solution No 3.

"After mixing, the solution is poured upon the plate, placed in a porcelain dish, where the image should appear after ten to forty seconds.

"When all the details have appeared, but faintly, the plate is gently washed, and put into another dish. This is better than holding the plate in the hand.

"Upon it is poured 100 cubic cents. of distilled water, into which has been put just previously 20 cubic cents. of the undermentioned solution:—

Water	300 cub. cents.
Glacial acetic acid... ...	20 ,,
Pyrogallic acid	2 grammes

"Into the solution is also put 2 cubic cents. of a three-per-cent. solution of nitrate of silver; in this way a sufficient degree of intensity is obtained, the solution being replaced again and again if very opaque films are wanted.

"The fixing is done with hyposulphite of soda, and the plates finally well washed."

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GILDING ON GLASS.

A new process by M. Dodon is thus given by the *Moniteur de la Ceramique*:—Gold, chemically pure, is dissolved in aqua regia (1 part nitric and 3 parts hydrochloric acid). The solution effected, the excess of acids is evaporated on a water bath till crystallization of the chloride of gold takes place; it is then taken off and diluted with distilled water of such quantity as to make a solution containing 1 gramme of gold to 200 cubic centimeters of liquid; a solution of caustic soda is then added until the liquid exhibits an alkaline reaction. The solution of gold is now ready for reduction. As a reducing agent an alcoholic solution of common illuminating gas is used. This is prepared by simply attaching a rubber tube to a gas jet, and passing the current of gas for about an hour through a quart of alcohol. This liquid (which should be kept in a closed vessel) is added in quantities of from two to three cubic centimeters to 200 cubic centimeters of the alkaline solution of gold before mentioned; the liquid soon begins to turn to a dark green colour, and at length produces the metallic layer of gold of known reflecting power.

As an improvement on the process, as well as for convenience in executing it, there may be added to the alcoholic solution of gas an equal quantity of glycerine (28° to 30° Baumé) previously diluted with its own volume of distilled water.

If the gold employed is an alloy, the foreign metals must in all cases be first removed; and especially the least traces of silver, because the very smallest quantity of this metal totally prevents the regular and uniform deposition of the gold.

The bath thus once prepared, it is proposed as a method of gilding mirrors; but also for all the articles of various branches of industry where this process of gilding could be used with success and to advantage—such, for instance, as boxes, necklace beads, candlesticks, glass ornaments, frames of table-mirrors, cups, saucers, spoons, lanterns, and reflectors, and for objects generally in glass or crystal that are capable of being completely gilded.—*Scientific American.*

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Correspondence.

DIRECT TRANSPARENCIES.

Sir,—I have lately been trying to produce transparencies direct from the camera, according to the plan described by Mr. E. Viles in Year-Book for 1877, pages 98 and 99, and which I have also seen mentioned in other places.

I use Liverpool emulsion plates, and get on all right until I have dissolved away the reduced silver with the nitric acid; but when I proceed to deal with the unreduced iodide, &c., which is left, my troubles commence. Instead of changing uniformly and gradually into a proper colour, the film, as soon as the developer is poured upon it, instantly shows numerous blotches and streaks, and I can get nothing but a dirty-brown tint, with no intensity at all, but embellished with the streaks, &c., aforesaid.

If you,* or any brother correspondent, can help me, I shall be very grateful.

My object is to produce glass stereo. slides. Supposing the above operations have been *successfully* performed, what is the best mode of toning the transparencies to the required tint.—I remain, sir, yours very truly, J. N. C.

[It is probable that you do not sufficiently remove the acid by washing with water; and unless this is effectually done stains will follow. If you do not get sufficient force and depth of tone, try the chloride of copper application as directed by Mr. Viles.—Ed.]

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* Through the pages of the News.

Talk in the Studio.

Photographic Engraving.—Scamoni's process is as follows: The original drawings are carefully touched up, so that the whites are as pure and the blacks as intense as possible, and then the negative is taken in the ordinary way, the plate being backed in the camera with damp red blotting paper, to prevent reflection from the camera or back of the plate. The negative is developed in the ordinary manner, intensified by mercuric chloride, and varnished. A positive picture is taken in the camera, the negative being carefully screened from any light coming between it and the lens. This is intensified by pyrogallic acid, and afterwards washed with a pure water to which a little ammonia has been added. It is then immersed in mercuric chloride for half-an-hour, and again intensified with pyrogallic acid. This is repeated several times. When the intensity of the lines is considerable, the plate is well washed, treated with potassium iodide, and finally with ammonia, the image successively appearing yellow, green, brown, and then violet-brown. The plate is then thoroughly drained, and the image is treated successively with a solution of platinic chloride, auric chloride, ferrous sulphate, and finally by pyrogallic acid, which has the property of solidifying the metallic deposits. The metallic relief thus obtained is dried over a spirit lamp, and covered with an excessively thin varnish. This varnish, which is evidently a special preparation, retains sufficient tackiness to hold powered graphite on its surface (the bronze powder now used may be employed instead), which is dusted on in the usual manner. After giving the plate a border of wax, it is placed in an electrotyping bath, and a perfect facsimile in intaglio is obtained, from which prints may be taken in a printing press.

Ingenious Advertising.—In an article on the "Drolleries of Advertising," *Chambers Journal* gives the following.—"During the civil war, hundreds of advertisements appeared like the following in the *Tribune*, February 1861. The attention is first rivited by the two lines:

'Important from Charlestown!
Major Anderson taken!'

Then proceeds the detailed explanation. 'On the 8th instant, about twelve hours before midnight, under cover of a bright sun, Colonel George S. Cooke, of the Charlestown Photographic *Light* Artillery, with a strong force made his way to Fort Sumter. On being discovered by the vigilant sentry, he ran up a flag of truce. The gate of the fortress being open, Colonel Cooke immediately and heroically penetrated to the presence of Major Anderson, and levelling a double-barrelled camera, demanded his unconditional surrender in the name of E. Anthony and the Photographic Community. Seeing that resistance would be in vain, the Major at once surrendered, and was borne in triumph to Charlestown, forwarded to New York, and is now on sale in the shape of exquisite card-photographs at twenty-eight cents. per copy, by E. Anthony, &c.'"

To Correspondents.

Venator.—Your claim, as you state it, appears to be a most reasonable one; but we are by no means sure that you will obtain a remedy in court—so much depends on the opinion of the judge! The only case of the kind which we remember being tried was one very similar to yours. Nine negatives were sent in a box by rail; of these, eight were broken, and a claim was made for £10, being at the rate of twenty-five shillings for each negative. The sapient judge thought that eighteen pence each was a more equitable estimate of the value of the negatives, and regarded the claim made as unrighteous and unreasonable—if not fraudulent. Of course it is not probable that many judges would be found to be so ignorant and prejudiced as this one appears to have been; but it might happen to be repeated. Hence a remedy by appeal to law seems to be very doubtful. We should try again to bring the carrier to some reasonable arrangement.

W. B.—An ordinary camera can be adapted to the purposes of microscopic photography. Our last volume contains two or three articles, with information, on the subject. See p. 104, March 2nd, 1877, and p. 281, June 15th, of the same year.

B. B. R.—We see no reason to doubt the permanency of collodion transfers if carefully produced and properly protected. We have seen no instance of a faded collodion print. Paper prints are doubtless protected to a considerable extent by being treated with encaustic paste. We have given from time to time various recipes for preparing encaustic paste. The following is Adam-Salomon's formula:—Pure virgin wax, 1 ounce; Gum elemi, 10 grains; benzole, 200 grains; essence of lavendar, 300 grains: oil of spike, 15 grains. Melt the whole on a water-bath, mix thoroughly, and strain through muslin. A simpler plan will be to dissolve the elemi in the solvents, as described above, and, after filtering, mix with the melted wax, as the filtration, which is chiefly intended for the gum elemi, is more easily managed before the wax is present. This, when finished, forms a stiff paste. By increasing the proportion of essence of lavender it can be made thinner, which, in winter, may be desirable. The encaustic paste is put on the print in patches in three or four parts, and then rubbed (with a light, quick motion) with a piece of clean flannel until a firm, fine surface is obtained. If a rich thick coating of the encaustic be desired, a very light pressure in rubbing is necessary, so that a polish may be acquired without rubbing off the paste in the operation. If a print be retouched, more especial care is required to use a light hand in applying the encaustic paste.

R. F. D.—Your request for instruction how to restore a disordered nitrate bath, is too vague to enable us to assist you efficiently. A nitrate bath may be disordered by many causes, each of which would render specific treatment necessary. Organic matter may be removed in various ways. Permanganate of potash may be used. It was suggested by Mr. J. R. Johnson some years ago. His instruction runs as follows:—"The bath to be treated should be turned out into a beaker or bottle, and a drachm of a ten-grain solution of permanganate of potash to a pint of nitrate bath added, the solution being then agitated. If the pink colour rapidly disappears, a little more may be cautiously added; and when a faint tinge of the pink or purple colour remains, the solution should be set aside for a few hours to allow the reaction time for completion. It is not necessary to go on adding permanganate till all trace of the smell of alcohol is removed, as a portion of that body may be present without producing injurious results. A chocolate-coloured deposit of binoxide of manganese, and, probably, a little permanganate of silver, will be thrown down if excess be added, and the bath will be weakened. It should be remembered, however, that the strength of a solution as ascertained by its specific gravity is not very accurately indicated after treatment of this kind.

M. S.—Pictorial or scenic backgrounds, if skilfully painted, are very effective, we consider, in portraiture, and relieve the monotony of perpetual plain backgrounds. Seavey's scenic backgrounds are amongst the best. Your remark that the most artistic portraitists rarely use scenic backgrounds is, we think, correct. The backgrounds in the cards to which you refer, were produced from nature, and effected by double printing, or by producing a combined negative. The late Mr. Burgess, of Norwich, produced a combined negative very ingeniously. He described his plan as follows: "I take the negative of figure and foreground with quite a dark, plain background, and, whilst still wet, after fixing, flow over albumen and water mixed in equal parts. When dry, I coat the plate with collodio-chloride of silver, and, when this is again dry, paint out with indian-ink all the figure and foreground. I then proceed to print from a transparent positive of the background on the collodio-chloride of silver, which will, of course, produce a negative of the background at the back of the figure. The indian-ink is removed in the process of fixing and washing, and the perfect double negative is ready for use.

H. Knight,—We waited at the place and time of appointment for an hour; but did not see you.

R. Morton Day.—We presume it to have been a shallow, flat box of tin, and holding hot water; but we were not present, and did not see it.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. Long, Exeter,
Five Photographs of Mr. Robinson Watson.
Cleveland Photographic Company, Middlesborough,
Photograph of £800,000 Cheque.
Mr. J. J. Gray, Birmingham,
Photograph of Benjamin Disraeli.
Mr. J. J. T. Glover, Dublin.
Two Photographs of Signor Gavazzi.
Mr. S. Wolstenholme, Blackpool,
Four photographic Groups of Lord Mayor and Sheriffs of London.

The Photographic News, September 6, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Unsteadiness of Pocket Cameras—The Paget Dry Plate Competition—Photography and Military Ballooning.

The Unsteadiness of Pocket Cameras.—Since the number of holiday-makers and tourists who take up photography, in order to bring home with them some reminiscences of their journey, has increased of late very much, it is well to point to a very general source of failure with which they are likely to be troubled. All apparatus made for tourists and travelling purposes is, as a matter of course, manufactured as lightly as possible. The camera and tripod may be, and is in most cases, solid and firm enough for their work, but they are so slight that, without care, their steadiness cannot be relied upon when the least wind is stirring. In a room, or hall, or enclosed court, they may be poised as delicately as you like, and will give clear, bright negatives; but in an exposed situation, even when the tripod appears firmly fixed, a slight breeze frequently brings failure. The dark slide should always be folded back, so as to avoid offering more resistance to the air than is really necessary, and the operation will be safer if you weight the stand with a stone or other handy object. More failures in out-door photography arise, in inexperienced hands, from unsteadiness of the camera than anything else, and, as these failures may be guarded against in nine cases out of ten, their occurrence is all the more vexing. A series of pictures we have recently seen (which were taken abroad by one who is but a mere novice in the art, and who has been employing commercial dry plates in an apparatus he purchased but three months ago), would have been exceedingly satisfactory but for this especial fault, for, as most of the photographs had been secured on the mountains, signs of motion were evident in every other impression. Even when you have weighted your camera, and tighten your screws to the utmost, the light apparatus, in the hands of most travellers, is usually quite incapable of steadiness in an exposed situation. It takes very little to set up vibration, and although the owner may do much with an umbrella in shielding his apparatus, he will act more wisely to watch the weather, and expose between the gusts if there are any. Skilful landscape photographers think nothing of capping sometimes half-a-dozen times during the exposure of a plate, not only by reason of the wind, but of the sun too, when shine or shadow happens to be desirable in portions of their picture. Those who desire to take good photographs should remember this, especially as the gossamer apparatus with which they have to work is particularly prone to shaking. Lightness and portability are, unfortunately, not compatible with stability in the matter of photographic apparatus, and, hence, those who travel with miniature cameras and stands must be prepared to meet the disadvantages which their handy paraphernalia involve.

The Paget Dry Plate Competition.—Captain Paget's dry plate competition is likely to call up a goodly number of claimants, but there is one difficulty which is always inherent to trials of this kind. The skill of the photographer himself enters into the matter, and this is difficult to estimate. A and B both submit dry plate processes, and we will suppose, for sake of argument, that in experimenting with them, the judges pronounce in favour of A's method. But B may, nevertheless, be able to produce what even the judges themselves admit are finer productions than those they have secured with A's materials; in other words, B produces, with his own hands, better pictures than can be secured by either A or his materials; but from the fact that, in the hands of a third party, the process of A answers better than that of B, the former gets the prize. This is no hypothetical case we are quoting. A photographer who has a pet dry process generally secures better pictures with it than he does from a simpler method which he is asked to adopt. We ourselves, for instance, have tried more than half a dozen various kinds of dry plates, but have still a sneaking liking for slow-going coffee plates, because they were the first we essayed, and because we have personally been more successful with them than with any other. They are slow, but they are sure. The pictures show a delicacy and a richness of tone which we find difficult to obtain in any other way; and yet it would be absurd on our part to give the palm to coffee plates in preference to all others. The fact is, the treatment of the plates has very much to do with success. With their preparation no one need occupy himself now-a-days, since one can purchase sensitized films of every dealer; but it is rare to find any one securing first-rate results who has not had a hand in the preparation of the plates themselves. The most successful dry-plate worker has always been the one who has served his apprenticeship at the process he practises, and understands every stage, from applying the preliminary coating to fixing the image. Again, preparing the plates is only half the work in dry-plate manipulation, the development of the result requiring quite as much care. As to exposure, that sinks into insignificance beside the former and latter manipulations. Now, what the Paget prize has been given for appears to be not so much for the production of a series of dry-plate pictures, secured by a certain process, the details of which are given and explained, but rather for a process which, in the hands of the average photographer, gives the best results. This is what photographers, both professional and amateur, want: a simple and certain method of preparing dry plates, which can be worked with uniformly good results under ordinary circumstances. Specialists with special processes are well worthy of encouragement, but the object of the competition alluded to is to secure for those hundreds and thousands who now employ the camera a good and trustworthy dry method.

Photography and Military Ballooning.—Some further experiments are to be made in this country by the Royal Engineers in the matter of obtaining reconnaissances by means of balloons. This time hydrogen is to be tried for inflating the machine, the gas being made in the field, and then compressed into cylinders. It is hoped in this way to be able to carry balloon, car, and compressed hydrogen all in one wagon. The hydrogen is to be obtained by decomposing water, and resolving it into its elements, oxygen and hydrogen. Water in the form of steam is passed through pipes filled with iron turnings; the oxygen at once proceeds to rust the iron, and the hydrogen is thus set free. The lightest coal gas that can be manufactured has a lifting weight of fifty pounds per 1,000 cubic feet, and as the small balloon which is to be employed for the present experiments can only hold 10,000 feet of gas, it follows that with this light coal gas, a lifting force of five hundred pounds is secured. But the superiority of hydrogen is at once perceptible when we mention that, filled with this gas, the same balloon is capable of lifting seven hundred pounds. Mr. Woodbury, it may be remembered, has patented a camera which is capable of taking pictures from a balloon without the presence of an aeronaut, and therefore, in this case, a balloon of much less capacity is needed. We do not know if his apparatus has ever been practically tried, but now that the subject of balloon reconnaissances has been revived, Mr. Woodbury would do well to urge upon the military authorities the advisibility of experimenting with his invention also. The military balloons now under trial are provided with electrical communication with the earth, and this, we believe, is all that Mr. Woodbury requires for the action of his balloon camera.

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PHOTOGRAPHY AND THE LATE ECLIPSE.

Mr. Norman Lockyer gives in *Nature* an elaborate account of the photographic operations at the late eclipse. He says:—

"In order to give an idea of the extensive preparations which have been made, I may state what were Dr. Draper's photographic appliances as an instance of the equipment at one station.

"In the first place, there was a telescope of five inches aperture, and seventy-eight inches focal length, especially corrected for photography, to get as complete a photograph of the corona as could be obtained by an exposure lasting during the whole of totality. This was during one hundred and sixty-five seconds.

"Next there was a large instrument which may be called a slitless 'phototelespectroscope.' This instrument consisted of an object-glass, composed of four lenses six inches in diameter and twenty-one inches focal length. The image of the sun at the focus was less than a quarter of an inch in diameter, and of extreme brilliancy. Before the rays of this lens reached the focus, however, they were intercepted by a Rutherfurd grating, about two inches square, set at an angle of 60°. This threw the rays to one side, and produced three images—a central one of the sun, and on either side of it a spectrum. One of these spectra was dispersed twice as much as the other, that is, would give a photograph of twice the length. This last photograph was actually about two inches long. With this instrument mounted equatorially, and driven by clock-work, if the light of the corona was due to gas, giving lines which lay in the actinic region of the spectrum, ring-formed images, one ring for each bright line, would be introduced. On the other hand, if the light of the corona arose from solid or liquid bodies, or was reflected light from the sun, a long band answering to the actinic region of the spectrum alone would be produced. If the light was partly from gas and partly reflected sunlight, a result partly of rings and partly a band would have been obtained.

"As there was an impression that it was impossible to obtain a photograph of the spectrum of the corona, Dr. Draper, in order to give the best possible chance of getting such a photograph, resorted to exceedingly sensitive materials, known as the lightning collodion process, furnished by the Messrs. Anthony, of New York. This involved a necessity of distilling a large part of the water used, because at Rawlins the water contains either alkali or sulphur, both of which are deleterious.

"Since so many attempts were made, I had better confine my attention to the photographs. I have seen those of Prof. Hall and Dr. Draper. I will first deal with those of the corona itself. The former, taken by a dry-plate process, and, I believe, by means of a large apertured camera of short focus, are very admirable, and show the structure at the north and south points most exquisitely.

"One of Dr. Draper's was exposed during the whole of totality, and represents a corona somewhat like those seen in the photographs of the 1871 eclipse taken with a medium exposure. In another, by a fortunate shake of the instrument, a trace of the outline of the chromosphere was received.

"Next I come to the Spectra; but first I may be permitted to refer to the only photographic contrivance which was possible for my light marching order. This was asmall portrait camera with a lens of one inch aperture, and a Rutherfurd grating of about 6,000 lines to the inch in front of it, to act as a reflector and disperser.

"I placed the camera and the attached grating on the ground in such a position that on the focussing screen I got the direct image of the sun at one edge of the plate, and running across the plate the spectra of the first and second orders on one side.

"In the spectra obtained, we had only one question to solve, as we all thought: we had to determine the position of the rings photographed in the first and second order spectra, or, at all events, in the first. Long before I developed my plate I knew what had happened. Dr. Draper, Professor Thorpe, and myself, had photographed the spectrum—this I never doubted—but we had photographed as continuous a one as if a platinum wire, or ball, in a state of incandescence, had been in front of our instrument, instead of a shell of hydrogen gas 6′ high, as in 1869, and 10′ high, as in 1871.

"Dr. Draper's plate was exposed during the whole of totality, to make assurance doubly sure. The continuous spectrum has no trace of a ring, though the plate was considerably over-exposed. In my own little photograph the continuous spectrum only is shown, and very clearly. While my plate was being exposed, I held a duplicate grating close to the eye, expecting to see the rings as I saw them through five prisms in 1871. In first, second, and third order, it was all the same—

Continuous spectrum,
Continuous spectrum,
Continuous spectrum,

and it was this which told me of the gigantic change which had taken place in the atmosphere of the great body we were studying.

"The remarkable phenomenon thus photographed was, of course, as remarked by the eye observers; still, bright lines were seen in the corona spectrum by one observer, using the term corona to represent everything outside the photosphere, and I make this remark because, whether the spectrum observed was that of the phenomenon which was visible or not, I cannot say.

"Professor Young himself, and many other observers, saw the reversal of many lines at the moment of totality, thereby endorsing Pye and Maclear's observations of 1870 and 1871. After this, to all but Professor Young the lines vanished utterly, and this was so absolute that in three parties there was consternation and fear, when nothing but a continuous spectra was seen, that something had gone wrong with the instruments.

"Professor Young saw 1474 very faint, *F without C*, and, strangest of all, the H and K lines without the long calcium line. This is one of the most remarkable results of the eclipse, and must set students of solar physics to work on a new line. Young thinks the H and K lines were brilliant enough to suggest that the ring in this part of the spectrum photographed in the eclipse of 1875 was really due to them, and I am inclined to agree with him, though why the H and K lines should appear minus the longest line of calcium passes comprehension, unless calcium is dissociated there from some cause of which at present we have no idea.

"The discovery of a line in the ultra red by means of a thermopile is another victory gained, and I sincerely hope that at the next eclipse Captain Abney may use some 'red molecules' to photograph it. Mr. Edison, with his wonderful tasimeter, also found indications of heat in the corona, but as he did not use a spectrum, he did not imitate Professor Young in determining the exact position of the radiation.

"We next come to the Dark Lines observed in the corona spectrum.

"Janssen was the first to announce the fact that in the corona spectrum the chief Fraunhofer lines were to be seen. This observation was made on the Indian eclipse of 1871. The natural interpretation of this observation is that in the coronal atmosphere there are molecules sufficiently complex to reflect rays of every refrangibility, and that they do in reality reflect the solar light to us as it reaches them.

"The observations on this point are a little doubtful, though it is held generally that the balance of evidence is in favour of their appearance. Prof. Barker, who observed with Dr. Draper at Rawlins, saw these lines at the moment that he was dumbfounded, as were most of the observers, at the absence of the bright ones. On the other hand, at Prof. Newcomb's camp at Separation, they were not traced, Commander Sampson seeing nothing but a perfectly continuous spectrum; 1474 F, and even C, being utterly invisible. If the corona gives us light containing the Fraunhofer lines, it can only do so because it reflects solar light. Let us next see, then, what the evidence as to Polarisation is.

"When all the observations on this subject are collected we may hope for much new knowledge, but the matter was not finally settled this time, for here again was a surprise.

"Professors Morton and Hastings had arranged to determine the quality of the polarization observed, Prof. Harkness was to attempt to photograph the phenomena, while Prof. Wright set himself the difficult task of quantifying it. One observer was specially told off to settle the questions raised by Prof. Pickering's observations of 1870. I may commence by saying that these last observations suggest that in 1870 the instrument used by Prof. Pickering was out of order, so that now everybody agrees that there is polarisation.

"I have not yet been able to learn anything of the results obtained by Professors Wright and Harkness, as the latter used dry plates, which were to be developed here, and the Las Animas party took a long mountain trip to shake off the bad effects of a long camping on an alcali plain, and so did not put in an appearance at Denver.

"Prof. Morton got radial polarisation most distinctly, as I did in India in 1871. The *amari aliquid* is to be found in Prof. Hastings' results, which will be best seen from the following account obligingly placed at my disposal by Prof. Bass, one of his party:—

"'The most important and unexpected result of the expedition was reached by Dr. Hastings in his polariscopic observations. It will be remembered that in previous expeditions, and by many observers in the present eclipse, only a few seconds were devoted to the examination of the corona for polarization, and this by a bi-quartz or a Savart polariscope, held in the hand so as to take in the whole corona in one view. In the organization of the expedition, Dr. Hastings was requested to prepare a plan by which the question as to whether the polarisation of the corona was radial or tangential, or absent, could be definitively settled. This was accomplished by an arrangement of apparatus essentially novel.

"The four inch telescope had a Savart polariscope at its eye end. A diaphragm perforated with holes, 3′, 4′, 5′, 8′, 10′, 16′, was interposed between the polariscope and the objective, and the polarisation phenomena of a definite and limited portion of the corona were thus seen. Diaphragms of 3′ and 5′ were alone used. The telescope was pointed by Lieut. Very to six points, the first one above the sun, and 50′ from the circumference; the second one 25′ from the circumference, and 45° from the vertical; the third 1½′ from the sun, and to the right of it; the fourth 16′ from the sun, and to the right of it; the fifth 16′ from the sun, and 135° from the vertical; the sixth 8′ from the sun, and 135° from the vertical. These points were selected before the eclipse, but it was not known to Dr. Hastings in what order they would be viewed, so that the readings were absolutely free from bias. The position of the pointer of the polariscope was carefully verified before and ofter the totality. The readings were reduced immediately, and each reading (which was, as is evident, independent of every other) agreed in showing that the plane of polarisation was perpendicular to the sun's radius through the point examined — that is, *tangential*—a most unexpected result, about which, however, there is no doubt whatever. Four of the readings were made with a dark band in the centre, and two with a bright band. This result does not agree with others from the same eclipse, for the reason that in the method adopted by Prof. Morton, Mr. Lockyer, and others, there was, first, no means adopted for isolating a definite portion of the corona, and determining its special polarisation. Second, that in the use of the Savart form, the phenomena of radial or tangential polarisation alike present bands radial to the sun. Third, that, with the bi-quartz, the field is so small that it becomes extremely difficult to interpret the tints of colour seen, if, indeed, any are seen. The novel fact was shown, by the use of this method, that the polarisation of the corona was exceedingly strong near to the sun's limb (one and a-half minutes), and was relatively weak far from it.'

"I believe that no one is more astonished than Prof. Hastings himself at the result of his work, which, it has been laughingly said, goes to demonstrate the existence of *ice crystals* in the corona. With reference to the remarks made on my 1871 work in the foregoing, I may add that I used a bi-quartz and a large field, so that the objections raised to the method do not apply.

"This brings me to the end of my notes for the present on the photographic, spectroscopic, and polariscopic results obtained. Of course there was a whole world of wonders outside these fields of enquiry."

PRODUCTION OF THE NEGATIVE FOR MAPS, PLANS, ETC.

BY CAPTAIN WATERHOUSE, B. S. C.,*
Assistant Surveyor-General of India.

After the due preparation of the original, the production of the negative is a point of the utmost importance, and may well be considered by itself before proceeding to the consideration of the various processes of photographic printing.

In order to obtain the most satisfactory results for photolithography, photo-zincography, or any other process specially appliacable to line subjects, the negative must be perfectly sharp all over, free from distortion, and possess the greatest amount of contrast between the lines and the ground. If care is taken to produce good negatives from suitable originals, results may be obtained which will compare with ordinary lithographs and engravings for sharpness and delicacy. The difference in the results of working with good negatives or bad ones is incredible; with a good negative from a good original every thing works well, but with a bad negative from a faulty original all kinds of difficulties may be encountered, and the attainment of a passable result is almost a matter of chance.

The first thing is to arrange the plan so that it may be copied without any distortion, and be quite sharp all over.

To ensure freedom from distortion, the lens employed must give an image quite free from all curvature of the marginal lines of a rectangle. In practice the most suitable forms have been found to be the "Rectilinear" of Dallmeyer; the "Doublet" of Ross; "Aplanatic" of Steinheil, and others on the same principle. The lenses known as triple combinations are also good. In the Surveyor-General's Office, Calcutta, Dallmeyer's Rapid Rectilinears are used and found to answer well. The lens should be worked well within its power, so as to use the most central rays; and to secure the sharpness of the image all over the plate, a small stop or diaphragm should be used.

The plan must be placed so as to be evenly illuminated by a good strong light falling as horizontally as possible, in order to avoid shadows being thrown by the grain of the paper, and thus diminishing the even opacity of the ground of the negative.

The apparatus for supporting the plans varies according to the nature of the work required, and may either be a perfectly smooth board fixed permanently in a truly vertical position against a wall or other support, a form which is very suitable when large plans have to be copied or reduced; or it may consist of a frame large enough to take a certain size of map, and capable of being adjusted in various ways so as to move up and down in a vertical plane or horizontally right and left, so that different parts of the plan may be brought in front of the camera without moving the plan on the board.[*] In any case, arrangements must exist, either in the plan-board or in the camera-stand, for making the plane of the map or plan to be copied exactly parallel to the plane of the sensitive plate in the camera.

The map must be attached to the plan-board so that it may lie perfectly flat and free from ridges. This is best secured by placing in front of it a sheet of glass which is fastened down on the board with pins at the corners. Or a glazed frame may be used for holding plans of a medium size. In either of these cases care must be taken to avoid any reflection from light objects in front of the plan-board.

It is convenient to have the plan-board and the focussing glass of the camera ruled in squares of one inch or other convenient size, in order to at once test the perfect parallelism of the sensitive plate and the plan-board.

When the work is confined to the reproduction or reduction of maps or other subjects of one fixed size on a single plate, it will be found convenient to draw a rectangle of the required size on the ground glass of the camera. When the image of the subject exactly fills this rectangle the adjustments of focus and parallelism will be correct.

The camera used for reproduction to scale should be at least of sufficient length to draw out to twice the equivalent focal length of the largest lens it is to be used with, and may be furnished with cone fronts to give further extension if necessary. With large cameras having a long range of focus it will be found convenient to have the back part of the camera fixed, and the front part carrying the lens moveable, so as to enable the operator to focus conveniently The camera may be fixed on a stand furnished with adjustments for moving it horizontally right or left, and have a tilting motion up and down, in order to adjust the camera perfectly level, or tilt it slightly so as to correct any want of verticality of the plan-board. The camera-stand should run upon rails fixed in the ground at right angles to the wall carrying the plan-board, thus enabling the distance of the camera from the plan-board to be easily and accurately adjusted according to the scale required. When using a reversing mirror or prism for taking reversed negatives for collotype and other purposes, it is a good plan, when possible, to have an arrangement for laying the plan horizontally under the lens at any convenient distance from it.

The whole of the apparatus connected with the camera and plan-board must be rigid and firmly fixed, so as to be free from vibration. The slightest vibration is sufficient to destroy the perfect sharpness of the image. In the glass-house attached to the Photographic Branch of the Surveyor-

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[*] *Journal of the Asiatic Society.*

[*] See my "Report on the Cartographic Applications of Photography," plates V, VII, and X, and Sir H. James' "Photo-zincography", plates I and II.

General's Office here, I have endeavoured, and I think with success, to overcome all vibration caused by carriages passing in the street close by, by dividing the floor of the camera-room into isolated blocks resting on a bed of sand, so that each camera shall stand by itself on a block isolated from adjoining blocks and from the wall and floor of the building. The plan-boards are fixed on a separate wall quite isolated from the walls of the building.

Plans may be copied either in the open air or under shelter; coloured, and old stained manuscripts, maps, or drawings are better copied in full sunlight. The glass-house I have constructed at the Surveyor-General's Office faces the south, and is glazed with ground glass, so that a strong diffused light may be thrown upon the plan-boards. When circumstances permit, it is well to have the camera and plan-board mounted on a firm stand working on a pivot, so that, as the day wears on, the position of the plan-boards may be changed so as always to face the sun. I adopted this arrangement at the Trigonometrical Survey Office, Dehra Dún, and I believe it has many advantages over the fixed glass-house rendered necessary in Calcutta by the constant wind and dust, and the greater necessity of being able to carry on work without interruption at all times of the year.

The negatives of maps, &c., drawn in line only, for reproduction by photo-zincography, are taken by the ordinary wet collodion process with iron development, modified so as to secure the greatest transparence in the lines and density of the ground; but, as the ordinary wet collodion process by itself will not give all the intensity required to produce an almost opaque ground, it is obtained by intensifying the negative in the usual way with pyrogallic acid and silver, after fixing; then treating it with a saturated solution of bichloride of mercury till the film becomes white, and finally applying a dilute solution of hydrosulphite of ammonia, which instantly changes the colour of the film to a dense black or brown throughout. The negative is afterwards varnished with a resinous varnish, or flowed over, while wet, with a solution of gum or gelatine, and allowed to dry. All defects, pinmarks, &c., are then stopped out with Indian ink or black varnish. In taking the large negatives on plates 32 by 24, that we are now producing for copying the maps of the Cadastral Surveys, it has been found that the first intensification may be produced by washing the plate after the first development, and applying a weak solution of nitrate of silver, followed by a second application of iron developer.

Other methods of obtaining the extra density required for these negatives have been proposed and are in use,* but, notwithstanding several inconveniences arising from the use of bichloride of mercury and hydrosulphate of ammonia, the above appears to be the best and most certain when working on a large scale.

When maps are not drawn entirely in pen and ink, but have the hills brush-shaded, and it is desired to reproduce them by the collotype or engraving processes, great care and skill are required on the part of the photographer to get the ground of the negative dense enough to give a perfectly clean impression in the white parts of the map, and, at the same time, prevent the grain of the paper from showing and give the faintest tints of the shading their proper value. Coloured maps also give a good deal of trouble, and when allowable the colour should be washed off as much as possible before the negatives are taken. Colours may sometimes be removed by chemical means, but there is risk of injury to the original.

In many of the processes about to be described it is necessary to use a negative which, instead of giving an image reading the same way as the original, shall give it reversed as to right and left. There are several methods of obtaining these reversed negatives.

(1). By coating the original un-reversed negative with a thick transfer collodion,† or a layer of gelatine, and then stripping off the film and either laying it down again on a sheet of glass in a reversed position, or using it as a film negative which may be used for giving both reversed or unreversed images. This method is practical and useful, but is not suitable for map-work on account of the liability t contraction and distortion of the image. There is also difficulty in keeping the film-negatives flat, and they have been found to become brittle and perish very soon in this climate.

(2). By turning the sensitive plate in the camera, so that the light acts through the glass, on the back surface of the film. This method is also practical, simple, and useful, but requires care in the selection of glass plates free from scratches, &c., and in wiping the back of the plate before it is put in the camera. It is used in the Belgian Topographical Bureau with dry tannin plates, but I have not found it suitable for reproducing very fine map-work on wet plates.

(3). By placing a reversing mirror or prism in front of the lens—the image thus passes through the lens reversed, and is impressed directly on the sensitive plate. This is one of the simplest and most effectual of all methods. If a mirror is used, it should be one silvered by depositing silver on the front surface, and should be large enough not to cut off the oblique rays entering the lens. A large solid reversing prism is expensive and heavy, but for moderate sizes an efficient instrument may be made by building up a hollow prism with glass plates, and filling it with a transparent fluid having a suitable index of refraction. M. Derogy, of Paris, has just invented an ingenious and economical method of employing a reversing prism by placing a small prism between the lenses. I have not seen any results of this arrangement, but it seems likely to be as effective as it is simple.

(4.) By what is known as the "dusting on" or "powder" process. A glass plate is coated with a mixture of gum, sugar, and bichromate of potash dissolved in water, thoroughly dried with heat, and then exposed to light under a negative. After removal from the printing frame, the gummy film is dusted over with very fine plumbago, which adheres to it in inverse proportion to the action of light, *i.e.*, those parts on which the light has acted refuse the powder in proportion to the intensity of the action of light, while the protected parts, attracting moisture from the air and so becoming "tacky," take the powder readily, and thus an exact transcript of the original negative is produced, but reversed. This method is simple and effective, and seems to be one of the best that can be employed when a mirror or prism is not available, or when, as is frequently the case, the reversed negative can only be obtained by copying from a single original unreversed negative.

(5.) By making a copy, either in the camera or by contact, on a film of collodio-bromide of silver. The image is developed as usual by the alkaline method, and then treated with nitric acid, which dissolves the reduced silver in the exposed parts of the film, leaving the bromide in the unexposed parts; the plate is then again exposed to light, and developed. This method, proposed, I believe, by the late Mr. Sutton, is said to give very good results, but the use of nitric acid is an obvious disadvantage.

(6.) By copying in the camera, first making a transmitted positive either by the collodion process or with a special pigmented gelatine tissue. This method is most useful when the reversed negative is required to be either larger or smaller than the original.

(7.) By means of the reversing action of the red and blue rays of the spectrum. This method is a discovery of my own, and has not yet been thoroughly worked out; it is, however, simple, and could, I believe, be successfully utilised. A film of collodio-bromide of silver stained with anilin blue is exposed to light for a few moments, then placed under a negative in a printing frame in front of which is a sheet of red glass, and exposed to light. The action of the light passing through the red glass in the clear part of the negative is to neutralise or destroy the effect of the previous exposure of the plate to light, and on development a more or less perfect reversed negative image is obtained. For line subjects a blue glass may also be used, but for half-tone work only a red glass can be employed.

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* See Abney, "Instruction in Photography," p. 22. † *Ibid*, p. 160.

In some processes, also, it is convenient to use either direct or reversed transparent positives instead of negatives. These can be obtained either by contact printing on dry collodion plates or gelatine tissue, or in the camera, in the manner adoped for making transparencies, as described in the text-books.

ON A NEW WHITE PIGMENT.

BY DR. T. L. PHIPSON, F.C.S., &c.*

For many years past attempts have been made by several chemists to discover some new mineral white of a less costly and less dangerous nature than white-lead, but very little success seems to have attended these researches until recently. Many years ago oxide of zinc, produced by the combustion of the metal in the air, was found to have certain properties which allowed it to be used as a substitute for carbonate of lead; but its production is very costly, and its "body" is not comparable with that of the latter. More recently an ingenious white or stone-coloured paint was economically produced from oxide of antimony, by Dr. Stenhouse, which appeared to answer very well in certain circumstances. During the last few years I have also made a great number of experiments in the same direction, hoping to utilise some of the artificial silicates which are remarkable for their brilliant white colour. To this effect I have submitted the silicates of zinc, magnesia, and lime, more especially, to a great variety of treatments, but have been hitherto unsuccessful in imparting to them anything like the "body" or covering power of lead carbonate. They all become more or less translucid when mixed with oil, and resemble in this respect pure silicic acid, whatever mechanical treatment they may have previously undergone.

Whilst occupied with these experiments I learnt that Mr. T. Griffiths, of Liverpool, had obtained a new mineral white, the basis of which was sulphide of zinc; and on submitting this new product to a careful examination I found, with astonishment, that it not only surpassed the old zinc white (oxide of zinc), but that it was superior in every respect to carbonate of lead itself. It is obtained by precipitating either chloride or sulphate of zinc by means of a soluble sulphide,—sodium, barium, and calcium sulphides have all been used for this purpose,—and precautions are taken lest any iron, that may be contained in small quantities as an impurity in the zinc solution, should be precipitated with the sulphide of zinc.

The precipitate, being collected and dried, is transferred to a furnace, where it is calcined for some time at a cherry-red heat, and carefully stirred, so as to bring all parts of it successively in contact with the air; it is then raked out, whilst quite hot, into vats of cold water, when it is levigated, and afterwards collected and dried. The result is a white pigment of exquisite beauty; its covering power when mixed with oil is greater than that of any substance hitherto discovered, being about 25 per cent. higher in this respect than that of the same weight of the pure carbonate of lead.

According to my analysis of this new product, it consists of an oxysulphide of zinc, the composition of which varies somewhat according to the duration of the calcination and the exact degree of heat attained. Hence it is not an easy matter to get it precisely of the same composition at each successive operation. Nevertheless, this point is attained quite closely enough for all practical purposes. The best product appears to correspond very closely with the composition $5ZnS+ZnO$. But occasionally a somewhat larger quantity of oxide is produced.

Of course a white of this nature is not liable to darken in colour by sulphuretted hygrogen emanations, as occurs with white-lead; but it has also the advantage of not proving prejudicial to the health of the workmen who manufacture it or who use it. I have compared it carefully with the old zinc white and with white-lead, as regards covering power, tint, and durability, and am perfectly surprised at the results of these experiments, which would be too long to record here; but knowing as I do, from the results of my own endeavours, how difficult it has been to discover a new white of these qualities, I look upon this oxysulphide of zinc white as one of the most interesting products hitherto derived from mineral chemistry.

OX-GALL IN LIEU OF WAXING SOLUTION.

BY M. E. LAMY.*

For some days past I have substituted for my liquid solution for waxing plates a new grease of a solid character, having for its base the fatty acids of ox-gall. This new material, I find, simplifies still more the development of carbon tissue upon glass. I prepare the grease in question in the manner following:—

An ox-gall is abandoned to the action of air in an open vessel until it has become completely putrified. To do this, an interval of eight or twelve days is required in this season. As soon as it has become sufficiently decomposed, the fatty acids it contains are precipitated by the aid of acetic acid. About 25 cubic centimetres of glacial acetic acid, or 100 cubic centimetres of vinegar are necessary, to separate all the greasy matter contained in an ox-gall of large size—say 500 cubic centimetres.

The precipitate is allowed to subside to the bottom of the vessel, which takes place in two days. It is decanted, and the clearest portion of the liquid is rejected. The other part, which retains the precipitate in suspension, is poured into a funnel at the bottom of which is a piece of fine sponge. If there remain any precipitate adhering to the bottom of the vessel, it is detached by means of a spatula, and thrown upon the sponge. As soon as all the precipitate has been deposited in this way, and has become dry, it is washed by pouring upon it repeated doses of water. Then the precipitate is allowed to drain, and in the end the sponge is pressed to get rid of the last drop of water. Then the precipitate is separated from the sponge, and it is mixed with an equal volume of melted beef suet or fresh butter, the latter being thoroughly kneaded into the ox-gall precipitate. To preserve the mixture from alteration, one grain of alum should be mixed with every 100 grammes of grease.

In this way a kind of pomatum is secured (insoluble in boiling water), which, applied by the aid of a bit of flannel, serves for greasing the cleaned glass plates. The latter are very lightly greased with the mixture, and care must be taken that the marks of the cloth are not visible upon the surface, as, otherwise, when the carbon pictures come to be developed, the markings will be visible upon the surface of the print. Plates greased in this fashion may be used immediately, or will keep good for some time.

The transfer of paper to these plates is managed in the ordinary fashion. After drying, the carbon film and transport paper may be separated from the glass with the greatest ease.

The preparation of this grease takes a long time, but a large quantity may be made at once, and its employment is rapid and convenient, while the results are invariably good. The advantage over a liquid grease is very great. One simple greasing of the plates is sufficient, and there is no need to wait for the surface to get dry. It is possible to treat a large number of plates at a time, for even if the grease becomes very dry, on standing, it soon gets moist again on the application of water.

It is possible to coat the plates with pure precipitate of ox-gall, and without the admixture of other grease. Although, when applied, it is soft and plastic, it rapidly dries, and soon gets pulverulent. In this case the carbon film refuses to detach itself, but adheres with great pertinacity, so that the precipitate would be useful in cases where the image is required to remain fixed to the glass. No doubt some substance could be found which, when mixed with the precipitate, would allow of its better application to the glass, while it would not lessen the adherence of the latter.

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* Read before the Chemical Section of the British Association Dublin.

* *Bulletin de la Societe Francaise.*

The Photographic News.

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AN ATTEMPT TO PHOTOGRAPH THE MIRAGE.

Of all the wonderful applications of photography that have been suggested, that proposed by Mr. Gresham, described as a practical mechanician of New York, bears away the palm. Mr. Gresham proposes to apply the camera for photographing ships upon the high seas at a distance of from one hundred to five thousand miles (what one might term a very wide application); and he is to employ in connection with the camera an artificial mirage. In fact, what he proposes to do is not to photograph the object itself, but its reflection upon a mirage. The mirage is to be produced by a vessel at a certain time in the day—say four p.m.—and this mirage (or cloud of vapour), rising above the ship, reflects the deck of the latter, upon which has been marked, in huge chalk characters, its number, together with latitude and longitude. These figures are produced in the mirage, and are capable, according to Mr. Gresham, of being photographed by a camera some thousands of miles away.

We should have been better pleased if Mr. Gresham had not gone so recklessly into thousands of miles. His phantasmograph, as he calls it, may be a wonderful instrument; but a thousand miles is a long way off. As to the matter of photographing a mirage, there would probably be little difficulty in undertaking such a task, provided the phenomenon were sufficiently distinct to the human eye. Mr. Gresham produces his mirage—or, rather, screen upon which the objects are to be reflected—by the aid of petroleum and asphalte vapour burned in a censer. The smoke and vapours ascend and hang over the ship (quiet weather is always necessary to the production of a mirage), and then, as we have said, this screen reflects any figures in white figures upon the deck. So sanguine is Mr. Gresham about the practical value of his invention, that he believes the time will come when all marine insurance companies will recognize it, and "insist that all vessels shall carry the necessary apparatus." In this way underwriters will always be kept *au courant* with the whereabouts of the vessels whose risks they have insured. On clear, calm afternoons, at four p.m. precisely, the ships are to send up their clouds of black smoke, and then observers on the watch will photograph the figures that may be seen reflected upon the smoke. Although we are not told so, we presume that the photographer will have to be content with securing images of the black clouds, for it will be impossible for the human eye—or even a good telescope—to view the white figures at any distance above twenty or thirty miles. These cloud images are, we suppose, to be placed under a microscope to reveal all information they contain. If, in this wise, Mr. Gresham hopes to secure reflections of objects fifty or a hundred miles distant even, he is, to our thinking, a very sanguine man.

We have said that to photograph a mirage should by no means be an impossibility. Mr. Glaisher, in his "Travels in the Air," speaks of a wonderful sea image seen from a balloon As they shot upwards there appeared above him a steamer and sailing vessel floating upside down, so that the esteemed president of the Photographic Society might well have fancied he was on a flying island, and that he had at last discovered Swift's island of Laputa. In this case the objects were so distinctly seen that they could undoubtedly have been photographed had the necessary means been at hand.

Again, it is only five years since that a most remarkable image was seen at Dover, in which a number of objects on the opposite French coast were as distinctly visible as if they were real. It was the neighbourhood of Boulogne which the people of Dover saw, and Boulogne, it must be remembered, is about thirty miles from Dover. In this case, again, many of the inhabitants expressed a belief that the picture before them could have been photographed. The weather at the time was remarably fine and hot, and beyond the heat mist in which the mirage was reflected there was not a cloud upon the horizon. The mirage became visible in the afternoon, and observers tell us that the dome of the Cathedral and Napoleon's pillar, as likewise the Crescent Walk, were visible to the naked eye; moreover, by the aid of a telescope of ordinary power, the entrance to the port, the lighthouse, the shipping and surrounding houses, the valley and hillside of Capecure, and the little village of Portel were to be seen. The adjacent coast was likewise shown in the mirage, the lighthouse on Cape Grisnez, and neighbouring windmill. Some of the houses of Boulogne had their windows illuminated by the setting sun, and stood out with extraordinary sharpness, and at one period a locomotive was seen to leave Boulogne and travel some miles in the direction of Calais, its track being marked by puffs and wreaths of white smoke. This Dover mirage lasted some hours, and did not terminate until after sunset, so that there was ample time to depict it in a camera had the lucky thought occurred to anyone provided with apparatus.

It is evident from this, then, that not only would it be possible to photograph a mirage, but that this phenomenon has a tendency to enlarge objects, a reason the more for pronouncing that Mr. Gresham's proposed mode of observation "has something in it." At the same time it must be remembered that, after all, the distance spoken of is much under fifty miles. Strange to say, we have already examples on record in which the mirage has proclaimed the whereabouts of shipping. One is recorded by Mr. Scoresby, and communicated by him to the Royal Society in 1822. He was on the coast of Greenland, where the presence of icebergs, by creating differences of temperature, is very favourable to the production of the mirage, and on one occasion he observed on the horizon an inverted image of a ship. This he examined carefully with a telescope, and was enabled to identify by sails and riggings as the very craft in which his father was a passenger. On comparing notes subsequently with his parent, he discovered that the two vessels on the day in question were thirty miles from one another, and therefore they must at the time have been hidden from one another by the convexity of the earth.

The legends anent the *Flying Dutchman* and the *Phantom Ship* are said to owe their origin to mirages at sea of this description, and there is little doubt that such is the case. Vessels are seen by sailors becalmed on the evening of one day, which are altogether invisible on the morrow, though the same calm has continued for many days. The phenomenon is only produced, of course, under certain specific conditions, and these Mr. Gresham hopes to establish, as we have said, by artificial means. He has given the matter of the mirage considerable study, and is of opinion that, with care and foresight, they may be imitated, that is, provided the weather is favourable. A lighthouse keeper on the Isle of France who enjoyed a great reputation for far-sightedness, and was regarded by his brother islanders as something of a clairvoyant, is said to have acquired his fame by a prolonged study of this aerial phenomenon, for he was certainly able to foretell the approach of vessels very frequently some time before their actual appearance on the coast. But Mr. Gresham must not talk of thousands of miles if he wishes us to give credence to the doings of the phantasmograph, for no circumstances are on record, so far as we know, of any visible mirage beyond a distance of sixty or seventy miles.

TRANSFER PAPER CHANGING COLOUR.

A word or two yet remains to be said on the subject of transfer paper for carbon prints losing the purity of its whiteness. A correspondent, whose letter appears in another column, raises some questions which seem pertinent enough, and demand consideration. He is also good enough to question the tone or spirit in which we have dealt with the subject. We are scarcely concerned to discuss this latter point, beyond saying that he is mistaken. We did not speak slightingly of the alleged instability of transfer paper, nor of the discovery that it was subject to change. The discovery had, indeed, as has been pointed out, been made by a gentleman of our own staff months before, and we published it early in April. We did speak deprecatingly of the tone, approximating to sensational, in which the experiments of Mr. Tunny were announced as the discovery of an unsuspected source of fading in carbon prints. If a *soupcon* of sensationalism be an element of importance in securing public attention, as our correspondent points out, then we were wrong in not being louder and more emphatic in the first announcement of the matter. But these things do not require discussing now.

Our correspondent complains that the fact announced places carbon prints, in some respects, in the same category as silver prints, by imparting an element of uncertainty, and making it doubtful whether they will change or retain their virgin purity. When it can be argued that because some prints do change, all may, confidence, he thinks, is gone. But here a moment's reflection will satisfy our correspondent that he is basing his argument on an inaccurate and fallacious statement. He is assuming that it is proved, or admitted, that carbon prints change, whilst, so far from this having been proved or admitted, it is distinctly denied and disproved. The carbon image does not change, but, in some cases, the tint of the transfer paper has changed. It is very important that this should be fully known and provided for. The Autotype Company, with praiseworthy promptness, investigated the matter as soon as it was definitely brought under their attention, and traced the immediate cases to their cause. A special sample of paper, of which they had had a stock, proved to be unstable in tint. How many batches of paper may have proved so we cannot state; but, once aware of the imminent possibility, we may feel assured that the Company will test future samples carefully. It is not a serious matter for the photographer to test for himself. A strip of each fresh stock of transfer paper exposed for a few days to light will fairly test its stability.

But, at the worst, we affirm the matter is not so serious as it at first sight might seem to be. We have, since we wrote on the subject, had opportunity of carefully examining a number of prints produced by the Autotype Company during the last few years. In regard to many of these we can say, without hesitation, that no trace of change or loss of purity in the whites can be detected. In regard to others, however, a lowering of tone in various degrees is perceptible. But we can emphatically say, in regard to these, that in no instance is the change perceptibly a detriment, whilst in some it is a positive advantage. The tint assumed is in all cases, as we have before remarked, analogous to that of the india tint prized for the whites of engravings. In some—reproductions of the works of Sir Joshua Reynolds—the tint seems especially to harmonize with the style of picture, giving a mellowness which is very pleasant.

The remark is trite enough, that all things are subject to change—even the granite monolith, which, after the many vicissitudes it has seen since the days of Moses, the lawgiver of Israel, has yielded in some degree to the effacing fingers of time. No one dreams, however, of alleging that granite is an unstable substance. To deal with more cognate subjects, oil paintings lose their original raw brightness of colour, but oil painting is not considered an unstable process. Even though some modern paintings are ruined with cracks, and one painting of a great artist is said to be lying in the cellars of the National Gallery with an eye which has glided from its place and slipped down to the chin, this is merely, and rightly, regarded as a misfortune due to the use of some untrustworthy material, and in no degree disturbs the credit of the art of painting in oil.

Many samples of paper change when submitted to light. Most samples of gelatine, if applied in a thick layer, will have a similar tendency; and it is clear that, for carbon work generally, these sources of change should be avoided; for however valuable a toned paper may be for many purposes, it is clear its use should be due to the choice and judgment of the artist, and not to the chance of change in transfer paper. The element of uncertainty which our correspondent rightly deprecates as undesirable may be eliminated by the use of a moderate degree of care and caution, and carbon prints be, like Cæsar's wife, not only pure, but beyond suspicion or distrust.

SUN PRINTING IN OIL COLOURS.

There is an old proverb to the effect that it is necessary to go from home to learn home news. In looking over a New Zealand newspaper, we find an article with the above heading accredited to the *Art Journal.* It is devoted to an account of a process (a secret at present) for producing facsimile reproductions of the works of great painters by photographic operations solely, no chemical being used "other than the ingredients which constitute oil colour." The article commences by patting photography on the back, and remarking that "during the present generation there has been no discovery that has done more to assist and popularize art than photography, and it still appears to be in its infancy. Much has been said against photography, lithography, and kindred devices, as destroying and not creating, artists. But is not the primary object of all lovers and teachers of art to desseminate it, in order to educate and train the eye of the skilled artizan so that he may produce the best and most beautiful forms?" The defect of photographs, it is added, was "the unstable nature of the production; but since the carbon process was discovered and perfected by Mr. Pouncy, of Dorchester, even that objection has been withdrawn." From this remark the reader will be led to the suspicion that the new method of producing photographs in oil colours is the work of Mr. Pouncy, and will probably come to the conclusion that if the claims of the new process are as well founded as that of Mr. Pouncy to the discovery and perfecting of the carbon process, no serious revolution in the art is yet imminent. The work produced is described as very excellent, the copies having all "the vigour of the originals." "In some instances the paint is thick and uneven, as though put on with the palette knife, thus avoiding that objectionable smoothness which prevails in chromo-lithographs and oleographs. Being almost a mechanical production, these copies are improved by a few touches from the artist's brush, and are thus considerably enhanced in value. Those not in colour require no retouching, no matter how minute and delicate the drawing and chiaroscuro may be, as every touch of the brush is faithfully represented, so as to make them invaluable as entirely truthful reproductions of the manner of the artists. They are executed in a few days instead of years, as is the case with the best engravings. Mr. Pouncy, of Dorchester, who we have before stated was the first to introduce the permanent photography known as 'the carbon process,' has gone on steadily working in the same direction for the last twenty years, in the hope of improving the stability of that process. Wishing to introduce colour into them, he has succeeded in discovering the method to which we call attention, of producing oil colour photograps.

"No one who has not seen specimens of paintings reproduced by the process in question can have any adequate idea of the wondrous fidelity of the copy to the original. No human copyist, of whatever skill possessed, could produce a work of such unerring accuracy, and such perfect fidelity of form and colour, light and shade, without variation of tint or tone, or subtlest effect of the original painter's skill. The manner of the pigment observed in the original is found in the copy. The chromolithographs, the oleographs, marvellous as they are as mechanical productions, present only a general imitation of the picture copied; the common eye knows them to be copies, since they are entirely wanting in individuality and force, while the fac-similes by this process are exactly what the term implies. They are not merely fac-similes of general effects, they are fac-similes of actual effect, even more completely than if the copy had been born of the original picture. For purposes of pleasure, or education, or connoisseurship, they are complete. A small gallery of such pictures would be as adequate for the promotion of taste or the education in the characteristics of the master, as a gallery of the originals would be. The invention appears to be one of the most marvellous additions to imitative art ever made known."

Whatever the method or the results, it is interesting to know that an early and persevering worker, even without the large claims made as to "discovery and perfecting," is still labouring in the same direction, and with, according to the description, a very definite success.

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WHAT CAN BE MADE OF PAPER.

A BERLIN correspondent of the *Times* gives the following account of a Paper Exhibition which has been opened in that city. The uses of paper cannot fail to be interesting to photographers. We take occasion, in passing, to enter a protest against a barbarism which occurs in the narrative. The term "albumen paper" is an absurdity. Straw paper means paper made of straw; rag paper, paper made of rags, and so following. Hence albumen paper should mean paper made of albumen. Our American cousins and Continental neighbours are responsible for the erroneous term instead of saying "albumenized paper." Englishmen should practically protest against this debasement of their language. The account runs as follows:—

"On entering the drill hall of the 2nd Foot Guards, kindly lent for the purpose by the colonel-commandant, one is struck by the wide applicability of the familiar andpa parently narrow term 'paper.' You are not easily persuaded that all you see around you is paper. It takes some time before you can bring yourself to believe that every object in this vast, elegant, and seemingly heterogeneous display is paper—nothing but paper. By the side of the ordinary quire on which you are in the habit of penning your 'private and confidentials,' there is paper linen from the collar to the petticoat; there are paper hangings from the simplest to the most gorgeous; paper carpets, paper curtains, paper chairs, paper tables, paper chandeliers, paper frames, and an infinity of minor knick-knacks for furnishing rooms. There is paper lace for nosegays and confectionery in every colour and design, strongly contrasting in its elegance with the less pretending, yet equally indispensable articles of cigar-case and blotting-pad. There are paper corals looking like the real zoophyte, paper ornaments and jewellery not easily found out as audacious impositions. There is the straw paper used for the most ephemeral productions of the press that do not outlive the day on which they are born; there is in striking juxtaposition that most durable of foolscaps employed for marriage registers. From tiny envelopes, the admiration of your lady companion, you stray to rolls of interminable paper 18,000 metres long; from the finest silk note, designed for 'own correspondents'' letters of professional length, you wander to a slip supporting on its sturdy fibre a weight of 600lb. A special department is devoted to albumen paper and similar niceties required in the photographer's art. Playing cards, invitation cards, and cartes-de-visite, master works of allied manufacturers. printers and painters, vary with equally grand achievements in the bookbinding, box making, and flower-making lines. To the most aristocratic portfolios are joined the loveliest portemonnaies; to a sailing boat are associated barrels as impermeable and water-tight as caoutchouc; while pasteboard figures remind you of the nursery, and gold and silver leaves speak of the Christmas tree and its social delights. Grimly overtopping these flimsy vanities stands the cellulose or compressed wood-pulp, of which the greater part of all paper is made in modern days. Quantities of rags are stowed away in a corner. Hidden from sight, as beseems their uncomely appearance, they will some day take rank among the most polished companions assembled in the crowded hall. The drugs that will purify them and qualify them to mingle in the fashionable society of their compeers are in close attendance, and so is the machinery, which fills the greater part of the hall, the courtyard, and the temporary sheds.

"Of the 600 exhibitors, but one shall be named in this unscientific account. His Serene Highness Prince Bismarck, Chancellor of the German Empire, being partner of the firm Bernhard Behrend, at Coslin and Varzin, in addition to his other titles and qualifications, may be mentioned as a successful manufacturer of this necessary of daily life. As we gather from the catalogue, the material wrought up in his mills is chiefly taken from the extensive woods at Varzin, the manufactory producing at present 40,000 cwt. of paper, 25,000 cwt. of cellulose, and 9,000 cwt. of ground wood per year. His Serene Highness, we are told by the same printed guide, employs 250 labourers, has steam-engines of 600 horse power, so-and-so many cylindrical machines, so many turbines, double turbines, &c. He purchases his drugs in England, and sells his goods in Germany, ungrateful Britain being no longer the good customer she formerly was. One of his great specialities is paper slips for the Morse telegraph apparatus."

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IN THE PHOTOGRAPHIC GALLERY.

BY C. E. RIKER.*

To most people a photographic gallery with its scenic backgrounds and accessories, its dark-rooms, and mysterious looking nooks, has something of a theatrical look about it, as if one were on the stage; and indeed, many an actress has been heard to say, as she posed for a negative, "This seems like a rehearsal with the stage in disorder."

It is almost impossible nowadays to keep the sky-light room in order, as the art has made such progress in the past few years that to have a well appointed gallery of the present day requires almost the properties of a theatre.

Do you wish your "counterfeit presentment" to appear wrapped in furs and calmly walking with a smile in a north-east snow storm? You can have it. Or would you prefer to recline in a dreamy attitude in some beautiful slyvan retreat? Or perhaps you think a Rembrandt bust with the classical vigour of marble is what your friends would like. Or a full length from the doorway of a rural cottage, with the honeysuckle in bloom, and pathway leading down to an old gate, that in the modern novel must be a "trysting-place." This is a favourite background with sentimental young ladies. Mayhap you have a studious mind, and like an interior with library and globe, and the figure intently perusing a book. Almost any style or whim can be produced, and the writer knows of an artist who is about to do the horse, that is, to have you appear upon horseback with full riding habit, cantering gracefully in the park. But if you leave the whole affair to the artist, and tell him you think he ought to know what is the correct thing, how you should dress, position, expression, &c., the chances are he will give you a plain head and bust, and, indeed, this is the very best picture, both in an artistic and common-sense view.

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* *Sunday Times*

The majority of people, when viewing their photographs, exclaim, "How cross I look! And yet, if I smile, it's a sickly, ghastly grin!" Of course, a forced smile while sitting is sure to look the same in the proof, and we would advise the subject not to attempt it, as it most always draws the mouth, makes it look large, and, in nine cases out of ten, is unsatisfactory. If you wish to look pleasant, do so from the eyes, and not from the mouth. "Laughing eyes" are expressive, and it is not so difficult to do as one would imagine.

But very few of the many who sit for their photographs are entirely pleased with the result. In the writer's twenty years' experience, he has invariably found that a stout person wants to look thin, a short one tall, a dark complexion light, and *vice versa*, and to a certain extent the operator, by means of position and light, can accomplish all of these. And he has found that the gentlemen are as vain as, if not more so than, the ladies. He has seen one of the sterner sex pose himself before a mirror for two long hours, and then leave without sitting, because, he said, he "couldn't strike any good position, but would call and try it another day."

A lady about to be photographed is chiefly concerned about her hair, and as the "crowning part of woman's glory is her hair," it behoves her to arrange it in a stylish and becoming manner. The gentleman bestows greatest attention to his moustache, in the absence of which his necktie is next in order.

The photographic artist faces many difficulties in the practice of his art. As to please everybody is expected of him, the necessity and difficulty of suiting people with their own looks is obvious. He must be a good chemist, have a thorough knowledge of light and shade, be somewhat of an optician, and above all he must have the patience of Job. For when Mrs. Smith fetches her cherubs, and an engraving representing three children lovingly entwined, smiling benignantly upon each other, and wishes her progeny portrayed likewise, has he not need of great patience?

It takes him an hour to coax them under the light, and when there the trouble has but just commenced. It is impossible to get them to hold their heads up. The operator approaches with a sweet smile and a hopeless heart, and makes an effort to get the head-rest behind them; they yell as if they were being tortured; all idea of a rest is abandoned. He then opens the light, and attempts a *coup d'etat*, tries to catch them, as it were, on the fly, grabs a bell with one hand, and the cat of the establishment (fortunately handy) with the other, at the same time yelling like a wild Comanche. These movements astonish the cherubs so much that they are struck dumb and motionless for a few seconds, which is taken advantage of by the operator to expose the plate. The agony is over. Mrs. Smith remarks that she hopes she won't have to try it again. The two lady friends who came with her to aid the affair by their presence say, "The children sat beautifully; if the picture is not good, it's no fault of theirs." An unnatural rumbling sound is heard in the direction of the dark room; 'tis the operator soliloquizing. A few faint, blue forked streaks dart from beneath the door. That is all. He reappears smilingly, says it's a success. Mrs. Smith will please call to-morrow and see a proof. She "hopes Mr. Photo won't put one at the door as a specimen; doesn't know whether Mr. Smith would like it or not, but she will see about that." He bows the party out with a sigh of relief, only to go, perhaps, through the same thing again. Verily the life of a photographer is not cast altogether in pleasant places.

Within the past seven years a new branch of the art has been developed: the retouching of negatives, or plates from which the prints are made. It consists of touching with the lead pencil all spots, freckles, and marks of any kind upon the skin. Shadows can be softened, thin necks, hollow cheeks and sunken eyes may be made plump, round, and full, without losing the contour and expression of the face. In fact, the wrinkles of age can be so softened and subdued by the skillful retoucher that if you are on the shady side of life, and desire to look ten or fifteen years younger, you have but to order it so.

It has often been asked why the pictures of actresses are so much better than other people. It is for the simple reason that they come dressed for a photograph, have a knowledge acquired in their profession of graceful positions, do as the operator suggests, and assist him by acting to procure the desired result.

One of the chief complaints he listens to while posing a lady is, "I feel so stiff and uncomfortable." He politely replies, "It is not a question of how you feel, but of how you look." Another common complaint is, "I could sit better if my head was not screwed fast in that vice." He replies, "Your head is not fastened; it is put there to keep the head steady, and in the position I have placed it." Very many persons, particularly ladies, think that, if they were allowed to throw themselves in a careless, easy position, with no head-rest, the picture would be superb. Not so; the result is horrid. The arms, perhaps, at right angles with the body, a dislocated wrist, the draperies hanging ungracefully, the hands out of proportion, and many features of the face bad; all of which are spoken of in detail hereafter, and the remedy therefore.

Every subject requires different treatment, more or less. Very few perfect faces and forms present themselves to the photographer. In one the nose is crooked; he remedies this by a three-quarter or side view. Another has one eye larger than the other, or, mayhap, a slight squint, but never knew it before (a common occurrence). He cures both defects by a profile, doing away with one eye altogether, and showing only the largest and straightest. The eyes are not always in line, one may be higher than the other; he tips the head gracefully, and they are level. An ill-shaped or protruding ear he will cover with the hair. The mouth is, perhaps, crooked and large. He will rest the head upon the hand in such a manner as to entirely hide this defect. Are the hands too large to look well? They will do better dropped in a fold of the dress, or else a side view presented. And then the drapery must be arranged to suit the figure; if a stout lady, the dress will not do with all the fullness in view; a thin lady requires the contrary treatment. What can be said of the expression, the most important of all? It is the life and soul of the photograph, over which the operator has no control; he can only say, as before, "Look pleasant from the eyes."

These are but a few of his trials, for his profession is one of science as well as art. His lighting of the picture must be good, and, most important of all, his chemicals must work harmoniously, or else all the care and attention bestowed upon the subject goes for naught.

In conclusion, permit the writer to offer a few suggestions to those about to visit the photographer's studio. Go a few days ahead, and make an appointment to sit at a certain time, and be prompt.

Wear dark clothing—brown, green, yellow, and red; all take dark, hence look well. A little powder on the hair, if a lady, will help to give more detail in the shadows. So take some with you.

Don't invite your friends, they will only be in the way.

When your proof is shown, and you're not pleased, tell the artist frankly what you object to. He can then remedy the trouble; but if you say, as many do, "I do not like it, and wish to sit again," how can he possibly know what will please you?

If you wear lace, choose that with large, open meshes; it shows the work, fine lace does not.

And remember, in choosing a position, that it is better to leave the whole matter to one who will know at a glance what your face and figure will do.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

Photographic Department.

Judges' Report.

BY THOS. HART.

The Judges have great pleasure in bearing testimony to the great advance made in their department during the past twelve months, and to the exceedingly high character of many of the exhibits. The rules of art in form, composition, light and shade, &c., seem to have been studied to good purpose by some of the photographers, and the consequence is that in many of their works there is a marvellous perfection which ministers to our noblest gratification, and the Judges hail with pleasure all those who are trying to lift photography out of the mechanical abyss, where it has too long remained, into a higher and purer sphere, and feel that they recognize, with their brothers of the brush, that the essence of art is spiritual.

Section 1.—Professional Photography.

1.—For the best landscape, size not less than 14in. by 11in., a first silver medal has been awarded to E. Forhead, Ventnor, for his fine view of "Old Church, Bonchurch," No. 604.

2.—For the best landscape, size not less than 11in. by 9in., a first bronze medal to Marsh Bros., Henley-on-Thames, for their view in Quarry Wood, near Great Marlow, No. 619.

3.—For the best landscape by the collodion emulsion process, size not less than 9in. by 7in., first silver medal to W. England, for his splendid Swiss view, No. 666. Mr. England exhibits fifteen gems (views in Switzerland), all in his well-known style, possessing the highest artistic excellence—full of atmosphere—broad, yet exquisite in detail.

4.—For the best interior, by any process, size not less than 11in. by 9in., a first silver medal to A. J. W. Penn, India, for his fine Indian Interior, No. 684.

5.—For the best portrait taken direct, size not less than 14in. by 11in., a first silver medal to W. M. Harrison, Falmouth, for his fine study, "Portrait of a Boy" (untouched), No. 638. This is more like a photograph from an "Old Master" than a study from life. It is full of artistic feeling, soft in outline where it ought to be, and the lines just strong enough where required, and all subservient to the face. It is a photographic triumph, reminding one of the "studies" seen in Rome and Florence.

6.—For the best portrait, size not less than 10in. by 8in., a first bronze medal to Robert Slingsby, for his Portrait of a Lady, No. 650. This is a very fine study, beautifully modelled, well lighted, and very soft; one of the finest portraits in the collection from an artistic point of view.

7.—For the best group composition or otherwise, size not less than 14in. by 11in., a first silver medal to Messrs. Chaffin and Sons, for their group "Checkmated," No. 614. This is a very fine composition, though the high lights in the faces are rather too strong. This remark applies particularly to 611, "The Musicians" (they seem under-exposed), and No. 612, "Popping the Question" (the heads are out of focus); but the Messrs. Chaffin are working and striving in the right direction, and, with a little more well-directed perseverance, we believe, will attain to the highest excellence. We hope to see their works again next year.

8. For the best enlargement, landscape (in carbon), size not less than 20in. by 16in., a first silver medal to W. M. Harrison, for his enlargement (untouched) No. 637. This is a view at Seaton, Devon, and is very fine in detail.

9. A first silver medal (special) is awarded to W. Brooks, Reigate, for his truly wonderful photographs of Caves, &c., taken sixty feet underground. The difficulties in a case of this kind must be immense, as they are taken by artificial light. Mr. Brooks had to deal with yellow rays, as well as with the darkness of the caves. By whatever process he did them, we consider the specimens sent triumphs of the photographic art; they have all the characteristics of photographs taken in open daylight, beautiful in detail, &c. The discovery is capable of being applied in various ways, and in a mining county like Cornwall it may be invaluable, as it shows that our deepest mines can now be photographed successfully What next?

10. A special first bronze medal is awarded to Robert Faulkner and Co., for their powder enlargement, "Dorothy Morrison," No. 585. This is wonderfully delicate in detail, fine colour, and altogether a very artistic production. Messrs. Faulkner and Co. exhibit several others equally good.

11. A first silver medal is awarded to David Hedges, for his Studies of Animals from Life, No. 596. These are in the artist's best style, and unapproached.

Reuben Mitchell, of Bolton, sends some fine examples of dry-plate work, No. 582 being especially good.

Adam Diston's carbon enlargement, "The Broken Toe," is a well-composed interior. No. 609, "Henry Kirke White in his Study," wants focus; the objects behind are too sharp; but Mr. Diston is working in the right direction, and we expect some fine specimens of photography from him. We hope to see his work here again.

Felix Bonfils sends several fine photographs from Egypt, &c., No. 634 being extremely good.

H. Garrett Cocking sends several splendid studies in his well-known style, No. 657, "Gitana," being remarkably good.

Messrs. Geo. F. Dew, J. Milman Brown, T. Nesbitt, and The Cleveland Photographic Company send specimens of good and earnest work.

Messrs. W. H. Oakley and Co. send "Photographic Appliances," with many improvements in apparatus, &c.

Amateurs.

The amateur department is also very well represented, and has several workers "running hard" many professionals. Charles A. Fernley, for instance, exhibits "Six Sketches near Reigate," which are photographic gems; but we cannot understand how Mr. Fernley, with his artistic feeling, could leave his skies so white; a little cloud here and there would make them perfect. A first bronze medal is awarded to his No. 707.

T. M. Brownrigg has a first bronze medal for his "On the Blackwater," No. 703.

Harry A. H. Daniel is awarded a first bronze medal for his "Cottage, Lynmouth," No. 717. He exhibits a good collection of photographs by the west collodion process; some are equisite in detail.

Other exhibitors sending good works are, Louis W. England, Henry N. White, Edward Brightman, J. Dudley Radcliffe.

A first silver medal is awarded to H. N. White, I of W., for his splendid series of photo-ceramics. These would do credit to any professional photographer. Mr. White must have an intense love for the art, or he could not produce such work.

INFLUENCE OF LIGHT ON PLANTS AND ANIMALS.

Some curious observations relative to the effect of different coloured lights on vitality have recently been recorded in the *Scientific American*. It remarks:—

"Prof. Paul Bert, who has recently devoted great attention to the study of the influence of light on animals and plants, denies that the leaves of the sensitive plant close on the approach of the evening, the same as if they had been touched by the hand. On the contrary, he finds that from nine in the evening, after drooping, they expand again, and attain the maximum of rigidity at two in the morning. What is commonly called the "sensitiveness" of plants is but the external manifestations of the influences of light. Professor Bert placed plants in lanterns of different coloured glass: those under the influence of green glass drooped in the course of a few days as completely as if placed in utter darkness, proving that green rays are useless, and equal to none at all. In a few weeks all plants without exception thus treated died. It has been proved by the experiments of Zimiriareff that the reducing power of the green matter of plants is proportionate to the quantity of red rays absorbed, and Bert shows that green glass precisely intercepts these coloured rays, and that plants exist more or less healthily in blue and violet rays. In the animal world phenomena of a directly opposite nature are found, and of a more complex character. Here the light acts on the skin and the movements of the body—either directly, or through the visual organs. M. Pouchet has shown the changes in colour that certain animals undergo, according to the medium in which they live. For instance, young turbots resting on white sand assume an ashy tint, but when resting on a black bottom become brown; when deprived of its eyes the fish exhibits no change of colour in its skin; the phenomenon, therefore, seems to be nervous or optical. Professor Bert placed a piece of paper with a cut design on the back of a sleeping chameleon; on bringing a lamp near the animal the skin gradually became brown, and on removing the paper a well defined image of the pattern appeared. In this case the light acted directly, and without nervous intervention. If, however, the eye of the chameleon be extracted, the corresponding side of the animal becomes insensible to the influence of the light.

"Professor Bert's conclusion, therefore, is that the circulation in the transparent layers of the skin must be affected by light. According to Dr. Bouchard a sunstroke is the effect of the direct action of light upon the skin, produced by the blue and violet rays. The heat-producing rays have no part in such accidents, as proved by the fact that workmen exposed to intense heats do not feel their fatal effect. Professor Bert, in a series of experiments on a variety of animals, found that none avoided light, but all rather sought it; and the lowest forms, like the highest, absorbed the same rays. As regards intensity of colour, however, there was a difference, some being more partial to one ray than another. Thus the microscopic daphne of the pond preferred yellow; violet was less in request. Spiders seemed to enjoy blue rather than red rays—so resembling people suffering from colour blindness. No two persons are sensible to the same shades or tones, while absorbing the same light; and this would seem to indicate that the retina possesses a selective power."

Correspondence.

UNSTABLE TRANSFER PAPER.

Sir,—I have been looking forward with some interest for further discussion of the most recent charge against carbon prints—the turning yellow of the transfer paper. This, it is true, is not fading of the carbon print, but, if it were inevitable or invariable, it would be as bad. The brief discussion evoked seemed to be chiefly devoted to a consideration of Mr. Tunny's susceptible feelings, and of the magnitude or the pettiness of his discovery.

I would here, sir, with your permission, interpose a word of remonstrance. I think, sir, with all due respect, that it was unworthy of the Photographic News to talk slightingly of Mr. Tunny's announcement, just because it appeared in another journal. This, sir, is unlike, and unworthy of, the Photographic News, and is a characteristic in which it should not emulate its contemporary. Besides, if the announcement were a little sensational in style, it is tolerably clear that a dash of sensationalism is often necessary to obtain attention. The change in transfer paper was distinctly announced in your own columns some months ago. On April 5th, in the page devoted to "Photography In and Out of the Studio," whilst discussing Dr. Van Monckhoven's allegation that many carbon prints turned yellow, you say that this yellowness often "is due to the transfer paper changing colour, and becoming yellow in itself. Let those who doubt this look at a sheet of transfer paper that has been lying in the studio for a twelvemonth exposed to the air. They will frequently find the whole surface is of a pronounced yellow, and if employed for transfer, the carbon impression would have all the appearance of a silver print fading away." And you add that this should be borne in mind in order that, when talking of fading in carbon prints, the saddle should be put on the right horse. Nothing could be more to the purpose than this; but because it occurs in an incidental paragraph, it excites little attention. Had you dignified it with the name of discovery, and devoted a leader to the subject, it would have excited general attention. Hence it will be seen that a little sensationalism has its uses.

But the worst part, sir, of the matter is the uncertainty it introduces. I think you have written somewhere, when dealing with the instability of silver prints, that the drawback of photography was not that all silver prints would fade, but that many might, and that the stigma lay in the uncertainty. Are we to accept the same uncertainty with carbon, and accept the dread of possible jaundice in our permanent prints? Or must we test every sample of transfer paper, and, if so, how long a probation will be necessary? The Autotype Company have, with becoming alacrity, after the sensational announcement, given attention to the matter, and traced it home. Will they in future give a guarantee with all samples of transfer paper? If the paper employed be quite trustworthy, is it quite certain that the gelatine coating will not change; or does danger lurk there? The subject once before the public, these and other questions will press on the attention. The stability of the carbon print must be like the chastity of Cæsar's wife, not only pure, but beyond suspicion. Can you, or the Autotype Company, or any trustworthy authority, answer the thick-coming questions suggested?—Yours, sir, respectfully,

Nigroque Simillima Cygno.

Talk in the Studio.

The Late Mr. Fordos.—We notice the death at Paris of M. J. Fordos, a well-known French chemist, and vice-president of the Paris Chemical Society. His name is chiefly known to photographers in connection with that of M. Getis as the introducer of the double salt of gold and hyposulphite of soda, known as "sel d'or," used much in guilding Daguerreotypes, and also afterwards in toning paper prints.

Photography *versus* Engraving.—The *Times*, in a notice of some recent engravings, has the following pertinent remarks on the relative value of photography and engraving:—"The employment of photography for the reproduction of pictures on a large scale, and with various modifications for facilitating multiplication, durability, and uniformity of impressions, appeared not very long ago to threaten the art of the engraver with extinction. What with the constant improvement of photographic procedure and apparatus, the discovery and perfecting of the Autotype process, insuring durability, and the ingenuity with which lithography and photography have been combined, it almost seemed as if there was no longer room for the slow and costly labour of the line engraver, or even for the more compendious translation of the mezzotinter. Even the new vogue of etching seemed to make against the engraver. When we examine such etchings as those of Rajon, or the head of Carlisle, after Watts, it seems as if we have all that engraving can give of force and effect in a more rapid and inexpensive method. But still more, which we see the perfect fac-simile of touch, texture, and effect obtained by the photo-lithographic processes perfected in the *ateliers* of Goupil, for example, and used for the reproduction of the battle subjects of De Neuville and Detaille, culminating in the 'Bourget' of the former, or the vigorous sea pieces of Mesdag—'Le Grain' and the 'Bateau de Sauvetage'—the handiwork of the cleverest engraver seems hopelessly outstripped, alike in force and fidelity; and as these transcripts are made from drawings in monochrome from the artist's own hand, and not from engravers' copies, the superiority appears even more decisively established. Photography has been for many years past regularly resorted to both in France and Germany to popularize all that was most successful in the picture production of the years, and at last, even in England, many of the most attractive pictures of the Royal Academy are in this way cheaply and promptly set before the public in black-and-white, till the sun, as it seemed, had vanquished the burin of the engraver as completely as it had usurped the vocation of the miniature-painter."

Photographic Maps.—The advantages of the process of sun engraving upon copper, as practised by the Austrian Military Geographical Institute, are dwelt upon in *Petermann's Mittheilungen*. The maps of the new Austrian ordnance map are carefully drawn on paper, on a scale of 1 to 60,000. They are then reduced photographically to a scale of 1 to 75,000, transferred upon copper, touched up, and printed. In this manner each sheet of the map can be produced in nine months, while the same amount of work, engraved in the usual manner, requires nearly 46 months for its completion. The whole of the Austrian staff map, consisting of 715 sheets, will thus be completed in ten or twelve years. No less than 271 have been published since 1874. The advantages of this process, as regards cost and rapidity of publication, are evident, and they fully compensate for any slight inferiority in the appearance of the work.

A New Cheap and Self-Generating Disinfectant.—Under this title Dr. John Day, of Geelong, Australia, recommends for use in civil and military hospitals, and also for the purpose of destroying the poison germs of infectious diseases, a disinfectant composed of one part of rectified oil of turpentine and seven parts of benzine, with the addition of five drops of oil of verbena to each ounce. Its purifying and disinfecting properties are due to the power presumed to be possessed by each of its ingredients of absorbing atmospheric oxygen and converting it into either peroxide of hydrogen or ozone. Articles of clothing, furniture, wall paper, carpeting, books, newspapers, letters, &c., may be perfectly saturated with it without receiving the slightest injury; and when it has once been freely used on any rough or porous surface, its action will be persistent for an almost indefinite period. This may at any time be readily shown by pouring a few drops of a solution of iodide of potassium over the material which has been disinfected, when the peroxide of hydrogen, which is being continually generated within it, will quickly liberate the iodine from its combination with the potassium, and give rise to dark brown stains. It may be applied with a brush or sponge, or if more convenient, as is the case with certain articles, such as books, newspapers, and letters, it may be simply poured over them until they are well soaked; they may then be allowed to dry, either in a warm room or in the open air. It is hardly necessary to say that this disinfectant should never be made use of in the neighbourhood of fire or artificial lights, for fear of accidents from ignition of the vapors arising both from the benzine and turpentine.—*Scientific American.*

Photograph and Phonograph.—Mrs. Swanborough declares that, after all, she perfers the photograph to the phonograph. The first, she says, gives you a fellow's whole features; the second only gives you his jaw.

To Correspondents.

H. W.—Exposing a dry plate under a negative for a few seconds and then developing, is a familiar mode of obtaining a transparency Exposure to gas-light will serve. Much depends upon the kind of dry plate as to whether iron development will serve or not. 2. The silver splashes to which you refer are probably what are commonly known as "matt silver stains." They are not due to the bath so much as to the collodion, which is probably of a horny character, repelling water and aqueous solutions. A more permeable or porous collodion is the best cure. As your present collodion gets older and riper it will lose the tendency. The addition of a drop or two of distilled water to each ounce, and shaking well, will mend matters. Immersing the plate in the bath before the film is well set is a help. Sometimes re-dipping the plate before development answers.

Lily.—Pyrogallic acid and silver will be found more useful for intensifying negatives after fixing than iron and silver. If iron and silver be used, it requires a large proportion of citric acid. A five-grain solution of iron with ten grains of citric acid and a few drops of a fresh twenty-grain solution of nitrate of silver may be employed with success. Great care must be used to use this in the dark-room.

T. L. P.—The Year-Books for 1864 and 1865 are, we find, out of print, so that if you do not possess them, we do not know where you can get them. If you will tell us precisely what you require, we will endeavour to supply the particulars.

Focus Jun.—The appearance of the cartes suggests faults in the fixing bath. We should expect to find it overmuch-used, and with some iridescent scum on the surface; but we could form a better opinion if we saw an unmounted and unburnished print.

J. W.—It is probable that your negative is too dense from the excessive bronzing before the print is sufficiently printed by printing in the sun. 2. An intensifying solution of pyro and citric acid may contain 2 grains of each to an ounce of distilled water. There is no need to immerse the negative a second time in the fixing bath when you intensify after fixing. You probably add too much silver, or you have too little acid; or your developing glass is not perfectly clean, or light reaches the solution. A variety of small causes will tend to produce this irregular reduction of the silver in the pyro solution.

Captain Davis.—The task of stating who are the best landscape photographers, and publishing their addresses, is a somewhat invdious one. We may mention a few who stand high, and give their addresses as published in the catalogue of the Photographic Exhibition:—Mr. Bedford, 326, Camden Road, London, N.; Mr. W. England, 7, St. James's Square, London, W.; Mr. H. P. Robinson, Winwood House, Tunbridge Wells; V. Blanchard, 289, Regent Street; Payne Jennings, Dublin; Henry Cooper, Torquay; R. Manners Gordon, Madeira; W. Brooks, Reigate; R. Crawshay, Cyfarthfa Castle, and a host of others.

Major (India).—The specification was not published. It does not contain the instruction in details which you desire. You will find general working instructions as given by the patentee on pp. 85 and 159 of our last volume, which contains many articles on the working details. We believe that announcements as to the manifacture and sale of Mr. Johnson's materials will soon be made. B. Personally we have had no experience in touching upon the films.

R. Gordon.—We shall be glad to see you when you are in town either at our office, or our private residence, which is Rose Lawn, nr. Catford Bridge, Kent.

E. Benthan.—We are much interested in hearing of any one working the Daguerreotype process in the present day. One of the most beautiful of photographic processes, it has been almost completely abandoned. We shall have pleasure in helping you, and we think we can give you tolerably full information on all points connected with the process. The class of picture you describe, with solid whites and little reflection, depends mainly on two or three things. Iodize to a deep rose, bromize to a steel colour; then develop very slowly over nearly cold mercury, so that development will require nearly an hour. Then gild as heavily as you can, just avoiding exfoliation. We once tried Laborde's suggestion, without much advantage. Your epitome of operations is very good. Nothing was published of the working of the process when photographing the Transit of Venus. We do not think that any work of importance on the subject has been published since 1852. One point you do not mention is of importance: Do you electro-plate your plates? This is a great improvement.

Enquirer.—A month is certainly a long time to elapse between sending a remittance and not receiving the book. But we really cannot advise you in the matter. Persevere in writing, and if you have any business agent in town, get him to call. We should think it due to negligence; or, possibly, no copies of the book are ready. Since this was in type your second letter arrived. All now seems right.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. S. Osbourne, Hunstanton,
  Photograph of Lynn Well Light Ship.
Mr. H. G. Cocking, Peckham,
  Photograph of Private Rae, 11th Stirling Rifle Volunteers.
Mr. H. White, Cheltenham,
  Photograph entitled "The Congress at Berlin, 1878."
Mr. G. Taylor, Bishop Auckland,
  Photograph of Mr. Richard Coad.
Messrs. G. & R. Lavis, Eastbourne,
  Photographic Group of Grand Duke and Duchess of Hesse and Family.
  Photographic Group of Grand Duchess of Hesse and two Daughters.
  Photographic Group of Princesses Ella and Victoria of Hesse.
  Photograph of Princess Victoria of Hesse.
  Photograph of Princess Ella of Hesse.
  Photograph of Princess Allix of Hesse.
  Photograph of Princess Mary of Hesse.

The Photographic News, September 13, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Thames Catastrophe—The Tax on Photographs Once More—Goose Sauce for Ganders.

The Thames Catastrophe.—In face of the terrible accident on the Thames last week, when, in all probability, seven hundred human beings lost their lives, it is a consolation, if but a poor one, to think that photography can render some aid to friends in recognizing their lost ones. Among the unfortunate who perished, it is certain that a proportion were strangers to the metropolis, country visitors who took the opportunity of their sojourn in town to make a trip on the river. Of these, no idea of their being missing will perhaps occur to their friends for many days, and hence it may arise that bodies will not be identified for a long time after they have been found. Indeed there cannot be a doubt that many of the drowned will have to be buried without being identified at all, and in this case a record of their clothes and general appearance will be retained by the police, together with a photograph of the remains. Copies of these photographs will be sent to every superintendent or local inspector of police throughout the country, and in this way, those at a distance who fear the loss of friends and relations may have their doubts set at rest. Were no measures of this kind taken, the most heart-rending doubts and fears must be for ever arising, and many at a distance would never know for certain what had become of their friends. Gradually, however, we have been developing a system of photography in connection with the police, so that now it is very rare indeed to find that the camera has not been brought in to assist in the work of identification. Unfortunately, with us the police is not one great organization throughout the country, but would seem to be governed differently in different counties and different cities. The Watch Committee of one town has a system of its own, and its chief constable is entrusted with the carrying out of that system, and it may have many points at variance with the police arrangements of the next town. There seems to be no head-quarters at all in the country. The Home Office does little else but "recommend," and even in London itself, as our readers know, there are two distinct heads of Police, the Commissioner of City Police and the Commissioner of the Metropolitan Police. For this reason it is that we do not in this country have such hard and fast rules as on the Continent. In Russia, for instance, the head of the police is a power in the country, and has probably as much, if not more, influence than any of the ministers. In France the police is also uniformly organized, and that is why we find that improvements are much more quickly introduced than with us. Take, for example, the use made of photography by the Paris police, where there is a regular staff devoted to camera work, and presided over by two inspectors, who are skilled photographers more than anything else. In Germany we find the same thing, that the use of photography in police matters has been quickly appreciated, and that they are far ahead of us in this respect. We are only now beginning to appreciate to the full the benefits of the camera in connection with police affairs, and this, as we have said, is owing in a great measure to the divided control of one's guardians of safety. Fortunate it is that, in the present awful catastrophe, the Metropolitan Police are sufficiently alive to the importance of employing the lens, for there can hardly be conceived an instance in which it can render better service. It would be well, we think, in performing this miserable duty, if only the head of the dead were in each instance photographed. The features are usually less objectionable to look upon than the stiffened limbs, and they are, too, the principal means of identification. Of course, a careful description of the clothing will be affixed to the photographs, and, no doubt, in most cases, the vestments themselves will be retained by the police, to help friends further in the task of identification.

The Tax on Photographs Once More.—The old question of putting a tax upon photographs is likely to be brought up again next season. *Mayfair*, which is usually a well-informed journal, understands that Sir Stafford Northcote has had it suggested to him by a "financial adviser" that if, next session, he finds it necessary to impose any new taxes, he ought to increase the duty on tobacco and impose a stamp duty upon photographs. *Mayfair* further thinks that the latter tax ought not to be unpopular, and it cannot fail to be remunerative, for nobody, our contemporary says rather viciously, will sympathise with the grievance of the cad if, when he buys a carte of Mrs. Langtry or Mrs. Cornwallis West, in order that he and his friends may gloat over these fashionable beauties, he is mulcted for the benefit of the State. A tax on photographs is to a large extent a tax on vanity and snobbery, and for fiscal purposes these foibles are surely fair game. So far *Mayfair*. In return for such criticism, we can hardly refrain from pointing out another and, to our thinking, a far more legitimate object of taxation: we mean the so-called society journals, which sell for high prices for the simple reason of the fashionable scandal and accounts of aristocratic backslidings which they contain. As newspapers they have no claim to existence whatever, and were it not for their "naughty and unwrong" utterances, to put it lightly, not a stockbroker's clerk in the City would buy them. Surely these might be taxed with impunity, for as *Mayfair* says, "nobody will sympathise with the grievance of the cad if, when he buys (one of the Society journals) in order that he and his friends may gloat over these fashionable (scandals) he is mulcted for the benefit of the State.' For ourselves we have as little sympathy for him who buys the one or the other, but we are confident of this, that were it not for the tittle tattle in the society journals anent the fashionable ladies in question, there would be no sale for their portraits in the shops about town.

Goose Sauce for the Gander.—As some carbon prints become yellow in the high lights from the circumstance of the transfer paper changing colour, may it not frequently happen that in silver prints the same cause brings about a change in the whites? All papers appear liable to change by time, if exposed to the air, and many must have observed in old books how the margins are yellow while the inside of the leaves is still white. As we usually select the whitest papers for photographic purposes, there is more chance of getting a material that has been tampered with by the paper makers, and if photographers would be content with a lesser degree of purity, we have no doubt they could secure more permanent results. The very white papers are certainly the most delicate in the market.

FRENCH CORRESPONDENCE.

The Treatment of Carbon Tissue with Alum—Substrata for Carbon Prints—Mr. Brownrigg's Photographs at the Paris Exhibition.

M. Lamy's Experiments in the Treatment of Carbon Tissue with Alum.—In my last letter I mentioned some of the modifications introduced into the preparation of carbon tissue by M. Lamy, and as these modifications have been pronounced by photographers who use the tissue to be considerable improvements, some account of them may be of interest. M. Lamy does not consider it necessary to treat carbon prints with alum, and, in a note which he has just communicated to me, he gives the following reasons for his opinion:—1st. Alum alone does not render gelatine insoluble; its action is confined to modifying some of the properties of that substance. Thus, when gelatine has been treated with alum, washed, and then dried, it will not absorb as much water as it did before at the same temperature and in the same space of time. It can only then be made to dissolve in a much hotter water. 2nd. A carbon picture that has been incompletely developed can be washed in cold water, and then treated with alum for a quarter of an hour; it is next rinsed, and submitted afresh (and while still wet) to the action of hot water. Under these circumstances it will recommence to develop, and finally become perfect. But if the same picture, after being treated with alum, and dried, be then softened in cold water, and again submitted to the action of hot, or even boiling, water, it will no longer leave the coloured gelatine, but, on the contrary, will remain in a pasty state. 3rd. When a picture has been insufficiently developed, but has not been treated with alum, it can afterwards, as long as it continues moist, receive an after-development by means of hot water, and thus be rendered complete. But if it has been previously dried, and then softened, it can no longer be finished, even in boiling water. These facts have been established by M. Lamy as the result of numerous experiments, and seem to him to prove that the action of alum is not the cause of the insolubility of the gelatine, for when the development is arrested, the latter could still be removed by the continued action of hot water. They show also that, after being dried, the image becomes completely insoluble, whether it has been submitted to treatment with alum, or not. In either case the gelatine of the proof always maintains the property of absorbing water; for it, therefore, there is always reason to dread the least appearance of moisture. At the same time a picture treated with alum requires a much longer time to become saturated with water than one which has not been acted upon by that substance.

Substrata for Carbon Pictures taken on Glass.—As regards the different substrata used for taking carbon pictures on glass for subsequent transfer, M. Lamy appends to his note some remarks which may be useful to our readers. According to his view, the best of all substrata is collodion, the only disadvantages in the use of it being its comparative costliness, and the length of time required for cleaning the glass plates and freeing them completely from any signs of grease. He adds that the operation can be made much more rapid by substituting for collodion one of the following substrata applied to the glass with a dabber:—1st. A solution of wax in benzine. 2nd. Stearine, also dissolved in benzine. 3rd. A mixture of precipitated gall with fat. Each of these substrata has its advantages and disadvantages, which the skilful experimenter proceeds to enumerate. Wax expands at about 50° C., and melts at 65° C. It is, therefore, only of use with emulsified papers, whose temperature at which they become soluble is lower than 50° C., for if the development require water at a higher temperature, the wax will swell, and will cause the pellicle to become covered with fine wrinkles—an accident which is commonly attributed by photographers to the inferior quality of the carbon tissue. If hot water whose temperature exceeds that of 60° C. be required for developing, the wax will melt, and will no longer serve the purpose of adhesion. The film will distend in those parts where it is thinnest, and cause the formation of bubbles. Finally, with water which is still hotter, the picture will crease and tear. All these serious inconveniences, however, can be avoided by using water whose temperature does not exceed 48° C., to which a few drops of solution of ammonia have been added. Water that has an alkaline reaction will render gelatine soluble at a lower temperature. Notwithstanding all this, glass plates rubbed with this substratum will repel water, and it requires very great skill on the part of the manipulator to make the emulsified paper to adhere equally. Stearine expands at about 55° C., and melts at 60° C. A substratum made of this substance, therefore, possesses the same disadvantages as the last. The solid substratum obtained by mixing precipitated oxgall with an equal quantity of fat has the advantage over wax and stearine of melting only at a temperature above 100° C. It expands at about 65° C. With this substratum, therefore, applied in the same way as one of collodion, carbon tissue can be used which has a much higher temperature of solubility. This advantage is very precious in hot weather, when one is obliged to use tissue prepared with hardened gelatine. Besides which, the precipitated oxgall does not repel water, so that its use renders more easy also the transfer. Water rendered alkaline with ammonia, however, dissolves it; in employing ammonia, therefore, to cause the film to strip off, or to weaken an over-exposed proof, we run the risk of lessening or destroying the adhesive power. The above remarks and observations have been reproduced here with the greater confidence, inasmuch as they emanate from a man whose experience in the carbon process invests him with special authority.

Mr. Brownrigg's Photographs and Process.—Many of the readers of the Photographic News will be acquainted with Mr. Brownrigg's beautiful landscapes. In common with all the visitors of the International Exhibition, I have had an opportunity of admiring the photographs which he has exhibited in the Palace on the Champ-de-Mars. What strikes one particularly in these charming proofs is the delicacy of the details in even the darkest parts, and the harmony that prevails in views where the play of light would lead one to expect strong contrasts and irregularities. More especially he has views of Swiss valleys where it would seem that every object is wrapped in intense shadow, and yet the objective has been able to discover and reproduce what the eye can with great difficulty distinguish. It might have been thought that under such circumstances there would not have been sufficient light; the skilful amateur, however, has succeeded in producing pictures of extreme delicacy and refinement. Mr. Brownrigg lately gave me the pleasure of a visit; and, in talking the matter over with him, he has kindly permitted me to place his method of proceeding at the disposal of my readers. All his pictures are taken by the wet collodion process, and when the subject that he desires to reproduce is dark and ill-defined in the shadows—as, for example, one of the valleys above mentioned, where the light penetrates with difficulty—he exposes for as long a time as forty minutes. Under these circumstances he has recourse to a double development, in which sugar plays an important part. He employs successively two solutions, of which the formulæ are as follows:—

No. 1.—	Protosulphate of iron ...	½	ounce
	Glacial acetic acid	½	,,
	Alcohol	½	,,
	Lump sugar...	2	ounces
	Water	19	,,
No. 2.—	Protosulphate of iron ...	100	grains
	Citric acid	100	,,
	Water	19	ounces

After the solution No. 1 has been applied, the plate must be carefully washed. To complete the development, some silver solution (30 grains to the ounce) must be added to solution No. 2, until the image has nearly acquired the desired intensity. Ernest Lacan.

CHROMOTYPE PRINTING.

BY J. R. SAWYER.

[We reprint the following digest of Autotype operations, as possessing the authority of the Company's practical manager. We reproduce from *Anthony's Bulletin.* We believe it originally appeared in the privately circulated *Notes* of the Company's.]

In the following digest of the operations necessary to produce first-class chromotype pictures, the Editor has had the advantage of comparing notes with some most successful workers, amongst whom he may mention Mr. Foxlee and Mr. Batho; and their assistance, combined with his own practical experience, will, it is hoped, enable him in this article to detail a method by which success will be attained if the instructions are carefully followed.

Use of Permanent Tissues only Recommended.—Having obtained your tissue, which should be of the kind guaranteed as permanent—No. 119, Chromotype Brown, or No. 120, Chromotype Purple—the first thing is to cut it up.

Materials for Cutting Tissue.—Cut upon a piece of stout zinc about 30 inches by 24, cut square and true; now, with a three-cornered file, mark it off into inches on all the sides, and number them by scratching on the zinc, from right to left, 1 to 24, 1 to 30; this will be a little trouble at first, but be amply compensated for by the ease and facility it gives in cutting; provide yourself with a T-square—it should have a metal edge, or your knife will soon ruin it; a good shoe knife with a square (not a round) point is as good as anything to cut with; provide four pieces of lead about the size and shape of a two-ounce weight, and with a piece of fine sandstone, to sharpen the knife upon, you are complete.

Suggestions for Sizes of Various Methods of Printing.—Now as to the sizes, that will, of course, depend upon the mode of printing you shall adopt.

Description of Various Methods of Printing.—We will give various methods, perfixing to each a distinctive letter:—

A. To print and tint nine cartes or four cabinet portraits at a time, for developing upon a 15 inch by 12 inch plate.

B. To print and tint four cartes or two cabinets at a time, developing on a 10 inch by 8 inch plate. Higginson and Batho's method.

C. To print cartes and cabinets separately, with Lambert's frames.

D. To print four cabinets, nine cartes, or two imperials, with Messrs. Greaves and Smith's patent printing-frames.

E. To print in the ordinary silver printing-frames, with fenced masks and tinters.

Description of best Method of Cutting for the Various Methods of Printing named Previously.—For A, cut the band of tissue exactly in half, making two bands 15 inches wide. This is easily accomplished by marking the centre of the roll, and applying the knife; work it backwards and forwards, keeping up a steady pressure till the roll is cut through, just as you would divide a pencil or round piece of wood; now unroll the tissue and cut it all up into pieces 11 inches wide; you can afford to trim off one inch from the outside edges, thus giving you pieces 14 inches by 11 inches. Result, 104 cabinets or 234 cartes out of each band.

B. Cut the band in pieces 14½ inches by the width of the band. If it be too large for your sensitizing bath, cut it two-thirds and one-third, the larger pieces giving 8 cabinets or 16 cartes; the smaller, 4 cabinets or 8 cartes. Result, 120 cabinets or 240 cartes out of each band.

C. Cut the band in half as described for A; then cut it into lengths of 13 inches; giving 12 cartes or 6 cabinets. Result, 264 cartes or 132 cabinets out of each band.

D. Cut the band into three equal parts instead of two as described in A: then cut it into lengths 13¾ inches long, for 4 cabinets, 9 cartes, or 2 imperials. Result, 126 cabinets, 283 cartes, or 63 imperials.

E. Cut the band in half as described for **A**; then into lengths of 13 inches, each giving 12 cartes or 6 cabinets. Result, 264 cartes or 132 cabinets out of each band.

Hints as to the Actual Mode of Cutting up Tissue.—To cut the tissue, unrol it gently, put it upon the zinc cutting plate, put the lead weights upon it, place its edge square against the lower edge of the plate, and square up by cutting a strip off the right-hand edge: then, registering it to the right-hand edge of the plate, shift it up so that you can see the numbered inches, apply your straight-edge, and make clean cuts right through the tissue.

The Keeping of Cut Tissue.—The cut tissue should be kept under a heavy weight, so as to come out tolerably flat when you wish to sensitize; a couple of metal plates with a four-stone weight are about as good as anything.

Ascertaining the Sensibility of the Excited Tissue.—Before commencing to print, it will be necessary to ascertain the sensibility of your tissue to the action of light, as compared with the silver paper ordinarily in use. This is most easily effected by selecting a small card negative of a medium density; then, having an Autotype actinometer, place in it a strip of sensitive silver paper, expose both negative and actinometer to light at the same time, and print the negative about as long as you would for a silver print; retire both, and note what tint is reached on the actinometer. Develop your picture on a bit of collodionized opal glass—you will see at once if it is too much, or too little, exposed; if it is not quite right, try again, and when you have succeeded, mark it with the number of tints it requires, and keep as your standard negative.

Marking the Number of Tints upon the Negative.—Before beginning to print, it will also be necessary to mark upon the negatives the number of tints they require; for that purpose it is best to keep a test negative of a pretty good density, say five tints; lay this upon a large piece of glass supported at an angle opposite to a window, and placing the negatives you are going to print beside this, mark them with the number of tints you think they will require, the test negative being your guide.

Making Negatives up to a Standard Density.—If, however, you go upon the plan of printing several negatives at the same time as in the methods marked **A**, B, and D, the negatives you are about to print must be made up to the density of your standard negative by placing behind them, whilst on the glass plate, pieces of thin mineral paper secured by a touch of gum. Before putting the negatives into the frames, it will be as well to see that the pads, velvets, American cloth, &c., or whatever you use, are perfectly dry, otherwise you may find insolubility produced by damp, and perhaps the tissue sticking to the negative as a consequence of want of care in this respect.

Carefully Wipe the Negative before Placing in the Frame.—Now put the negatives carefully into the pressure frames, dusting them over with a soft camel's-hair brush to remove any dust or particles which would adhere to the tissue by pressure, and form specks and blemishes.

Wipe Tissue with a very Soft Cloth or Leather before Putting into Pressure-Frame.—Before putting tissue into frame, wipe its surface with a piece of fine muslin or wash-leather, and take care to push it up into the registering corners of the printing-frame; fasten up the frames and expose to light, at the same time putting out the actinometer. When the silver paper in the actinometer has reached the required tint, the frames must be retired, and the pieces of tissue will be ready for the next operation.

Tinting Borders.—Whichever method of tinting be adopted, care must be taken to adjust the tissue accurately to the register corners; the time of exposure to the light will be dependent upon the depth of tint wished for. The new Autotype actinometer is arranged for tinting as well as printing, and by taking the tint there given as a standard, uniformity of results can be easily obtained.

Freshly Sensitized Tissue not in the best Condition.—Before proceeding any further, it may be as well to remark that tissue always produces better pictures if used a day or two after being made sensitive to light; there is much less danger of the lights washing away, and softer and better pictures are produced with tissue in this condition than with freshly sensitized. The general practice seems te be to sensitize the tissue one day, and use it the next; but it is one of the great mistakes of pigment printing to use the tissue too freshly sensitized.

The Continuing Action of Light.—Another matter which, although not likely to have much bearing upon general practice, may occasionally be utilized, is the continuation in darkness of the action set up by the light: thus, pictures known to be under-printed in the latter part of one day, will, by the next morning, have acquired as much force as if they had had a proper exposure. In the dull days of winter it would be very possible to organize a system by which the pictures might be given a shorter time of exposure than would be necessary in ordinary cases, and, by keeping till next day, be capable of being developed into perfect pictures; and, as a matter of fact, it has been found that this is a most admirable way of preventing the washing up of the delicate half-tones.

Apparatus and Materials Necessary for Development.—Development.—The materials necessary for development will be two zinc trays of a size proportionate to the amount of work to be done, say from 24 inches by 18 inches to 4 or 5 feet, a squeegee, a piece of india-rubber cloth, wooden stool, opal or plain glass, waxing solution, dusting brush, special collodion made with porous cotton, and an ample supply of perfectly clean hot and cold water.

Development on Collodionized Glass, Opal, &c.—The development of chromotype pictures takes place upon plates of glass, usually opal of that kind known as polished patent plate; this, after being treated either with a solution of wax and benzole, or with French chalk, is coated with collodion, which, after being allowed to set, is immersed in water, and kept there a sufficient length of time to allow of the solvents of the cotton being completely washed out. The first proceeding is to treat the plate with some material ot a greasy nature, which, by its repellent action, will enable the picture to be stripped from the glass.

Waxing the Plates.—Having your sheets of opal of convenient size, say 15 by 12 inches, lay one down upon a few sheets of blotting-paper, pour into the middle a small quantity of the waxing compound, composed of 100 grains of pure bees' wax, dissolved in 20 ounces of pure benzole; with a pad of *papier Joseph* rub this well into the plate, and, with another clean pad of *papier Joseph*, polish the wax remaining on the plate. Be careful, if the plates are new, not to polish off too much. When the plates have been used a few times, there will be little or no danger of this; but with new plates the sticking of the picture is very often a consequence of polishing off the wax too closely.

The Plates to be Gone Over with a Dusting Brush, and Stored for Use.—The plates, properly waxed, should be dusted with the camel's hair dusting-brush, then reared up close together ready for use. They should be prepared some time before they are required.

Collodionizing the Waxed Plate.—Having a tray about half full of perfectly clean water, coat a plate with collodion in the usual manner, same as for a negative, and allow the collodion, after being poured from the corner, to set well; then plunge it into the water contained in the bath, and allow it to remain there until the water ceases to flow irregularly from the plate on its being lifted out; when this takes place, the plate is ready for the exposed tissue to be placed upon it.

Placing the Exposed Tissue in Cold Water.—Fill the other bath with clean cold water (the temperature in summer should never exceed 60°). Immerse the sheet of tissue in this, passing the hand carefully over its surface to remove any adherent particles, and allow it to remain there until, having at first curved inwards towards the film, it just begins to straighten itself out.

(To be continued.)

THE STEREOSCOPE AND ITS USES.

Circumstances which Enable us to See the Roundness of Objects.—During the discussion of the aids employed to produce a stereoscopic effect in pictures, the question may perhaps have arisen in the minds of some readers, whether it is, indeed, really necessary to wait until such a peculiar illumination presents itself, or to produce it in the studio; and whether it would not be sufficient to simply reproduce things in precisely those colours which they happen to show at the moment. As nature always makes the impression of bodiliness, it would appear that by a simple, truthful reproduction a strong relief must always be obtainable.

"This conception, which we meet with in some of the latest naturalistic school (Courbet, Victor Muller, and others), is based upon a very erroneous conclusion, to which attention was already drawn by Lionardo.

"It would be correct if the impression of bodiliness in nature were really produced only by colour and by light and shade—that is to say, by the same means which are at the command of the artist. This is not the case, however, for in nature a number of other circumstances are at work, which aid us in determining the distances of objects, or of their various parts; or, in other words, which assist us in perceiving the corporeal qualities of the things which we see.

"If, for instance, we desire to ascertain the relative position of several objects situated at various distances, we can do so by moving the head or the whole body, as these movements produce unequal apparent changes in the position of the objects, by which changes the judgment is aided. But we possess another exceedingly effective means for perceiving depth in space, even when the body is perfectly at rest, in the mutual activity of our two eyes, a means which is not available to the painter, since he is confined to a plane surface for the representation of his picture.

"It is a well-known fact that we look at all objects with our two eyes from two different points of view, and that we therefore really see two different pictures of the same object; or, in other words, that the two perspective views of the outer world which are projected upon the retinæ of the two eyes differ somewhat, so that each of these views has a different centre of vision.

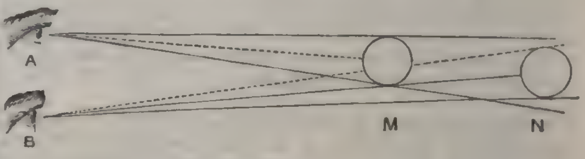

Fig. 1.

"This is very clearly explained by fig. 1, which is a copy of a drawing made by Lionardo da Vinci, for the purpose of illustrating the point under consideration. Two balls, M and N, are so placed upon a table that only the nearer ball, M, is visible to the left eye, A, of the observer, the more distant ball, N, being hidden by M. The right eye, B, however, sees not only the ball M, but also one-half of the more distant ball N.

"If we really make this arrangement, and then look at it with unprejudiced eyes, we shall simply see the two balls behind each other, only that part appearing to be hidden which is also invisible to the right eye. As soon, however, as we close the left and the right alternately, we shall find that the view is somewhat different for each.

"An analogous case can never be produced by a drawing upon a plane surface; and Lionardo therefore observes, very correctly, that a painted object can never present the full corporeal appearance of a real object, even with the most rigid adherence to all the rules of perspective and of the treatment of colour.

"*The Stereoscope.*—This statement by Lionardo, which, although quite brief in the original, is, nevertheless, very easily understood with the aid of the drawing accompanying it, remained unnoticed until the year 1838, when

Wheatstone, following out the same train of ideas, discovered the stereoscope. Wheatstone reasoned very correctly as follows:—'If two perspective drawings of one and the same corporeal object are offered to the eyes, the two drawings corresponding to the views which the two eyes would, in reality, receive if looking at the object, and if care is taken that one eye sees only one drawing, while the other sees only the other, the impression produced must be the same which would be produced by the body itself—that is to say, the object must appear to be round.' His conjecture proved to be true, and the stereoscope is now to be found all over the world.

"The apparatus which is employed in looking at stereoscopic pictures is, not indeed, absolutely necessary, and after some practice it is possible to obtain the stereoscopic effect without any apparatus whatever. For this purpose it is, however, necessary to give an unnatural position to the eyes, and the stereoscopes are therefore provided with prismatic lenses, which permit the eyes to retain their natural position, and, at the same time, serve as magnifying glasses.

"The difference which must exist between the two stereoscopic views belonging together will perhaps be best understood by the following illustration:—Let us suppose a truncated, four-sided pyramid to be placed before us upon a table. Looking at this pyramid from above we shall see somewhat more of its left side with the left eye than with the right, and *vice versa*. The left eye will therefore see the view *a* of fig. 1, while the right sees the view *b*. If we now look at *a* with the left eye, and *b* with the right in the same moment of time, we must also see the pyramid. To obtain this effect we must introduce a partition (best of all a piece of dark-coloured cardboard) between the two eyes, so that *b* shall be hidden perfectly from the left, and *a* from the right eye, and we must then adjust our eyes as if we wished to look at some distant object, while holding the book in a vertical position, which is the best for the success of the experiment. Having done this, we shall instantly see the two pictures coincide, and the truncated pyramid will appear before our eyes with its basis turned away from us, and having the appearance of a model made of fine wire.

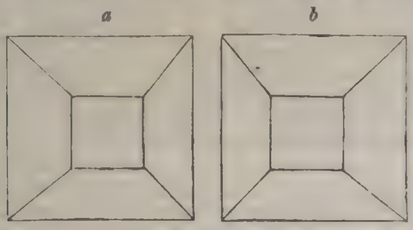

Fig. 2.

"Those who cannot make the experiment succeed with unaided eyes will of course have to use a stereoscope; but the figure will, nevertheless, serve to illustrate the difference which the two pictures must show."—*Dr. Von Bezold's Theory of Colour.*

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ON SOME SIMPLE LABORATORY MANIPULATIONS.

BY DR. P. TOWNSEND AUSTEN, F.C.S.[*]

Assistant Professor of Analytical Chemistry in Rutger's College.

Removing Precipitates from Folded Filters.

The ease with which a folded filter is made, and the rapidity with which it filters, are more than counterbalanced by the difficulty with which the precipitate is removed from it. If a spatula is used the paper is quite sure to break. Making a hole in the paper, and washing the precipitate down through it, is a slovenly operation, and takes time and much water.

By the use of the following method[*] it can be removed easily. After washing the precipitate down to the point, remove the filter, and place it on a round, flat glass,[†] somewhat larger than the paper. Carefully pull the paper out on the sides, when it will be found that the folds will come out, and the wet paper will adhere closely to the glass. The precipitate can now easily be removed by means of a spatula; or by holding the glass plate nearly vertical, and manipulating a small stream of water against it, it can be washed completely off the paper, and, with a little care, into a vessel with a small mouth—a test-tube, for example.

Washing Glass.

Such a subject may seem *too* simple, but yet the more I see students at their work, the more I am impressed with the fact that but few know how to wash a beaker-glass *clean*.

Some time since I took beakers from various students in my laboratory (which they had washed and put away), and held them under a powerful stream of water until they were thoroughly wet. On taking them from under the spout, in almost every case the water ran off the glass in spots, showing that the glass was greasy.

The best thing to wash beakers, &c., with (according to my experience) is sand-soap. Naturally, the sand must not be sharp. The soaps containing infusorial earth are most excellent for this purpose. Borax soap is also very efficacious. A piece of board about twenty c.m. long, fifteen c.m. wide, and four c.m. thick, should be screwed on the right (inside) of the sink. In this block a rectangular hole, about two c.m. deep, and one c.m. smaller than the section of the soap when stood on its long end, is to be cut. The bottom of the cake of soap is then whittled away so that it fits tightly in the hole. It is now moistened and pushed into the aperture, where it remains tightly fixed. By wetting the right hand thoroughly, and rubbing on this soap-ridge, a good lather is made. With the soapy hand the glass is rubbed and washed until, on taking it from under the stream, no oily spots appear, the glass appearing wet all over. The beaker is then dried with a good towel ("glass towel"), and finally polished with a piece of chamois or kid leather. The final polish with kid is necessary, since the best towel leaves fibres on the glass. In cleaning test-tubes it is only necessary to rub the probang on the soap.

A Simple Mattrass Holder.

Of the numerous forms of instruments for holding mattrasses, &c., Bunsen's wire clip is undoubtedly the best. In blow-pipe analysis I have lately used the following simple device, which is at once very convenient and inexpensive:—

On the points of a lady's hair-pin, about eight c.m. long, and one c.m. wide, small corks are fixed. The insides of the corks are then cut away, so that by pressing them together the wires may be brought within about five c.m. of each other. With this simple clip, mattrasses, open tubes, and even small test-tubes can be securely held and easily manipulated.

Another device, and just as good, if not better, is the following:—Take a wooden spill or lamp-lighter, such as are sold everywhere, about thirty c.m. long, one c.m. wide, and one m.m. thick, and break it in the middle. Almost all of these spills are made of wood tough enough to form a flexible joint. With this the mattrass or test tube is easily grasped and firmly held. I usually keep a quantity of the spills in one of the divisions of a drawer.

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[*] From a series of papers on the subject in the *Chemical News.*

[*] This method is mentioned in the last German edition of Fresenius's "Quantitative Analysis." I wish merely to draw attention to the great saving of time resulting from its general use in qualitative analysis.

[†] A piece of ordinary window-glass will do.

The Photographic News.

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DISCOLOURATION OF PHOTOGRAPHIC PAPERS.

One very definite outcome of the late discussion on a supposed new source of fading in carbon prints is the certain conclusion that some samples of paper used in photography are subject to a change or degradation in colour when submitted to the action of light. They lose the purity of white which is one element of brilliancy and effectiveness in a picture, and acquire a low tone varying from a cream tint to a pale yellowish brown. As we have said before, the tint assumed in some cases is not offensive from an artistic point of view. But there are cases in which any deviation from the purity of absolute white is very undesirable. In all small photographic work, for instance—such as cartes-de-visite, especially—a pure brilliant white is desirable, any low or creamy tint giving the picture a dull and dingy effect. Moreover, the change may not always produce an agreeable tint; and any change not of intention, or not entirely under the control of the producer of the picture, must be undesirable, and often offensive, to be avoided and protested against wherever it occurs.

We learn from Mr. Tunny that his recent communication on the subject was not the result of a single or accidental observation, but of many careful examinations. From the earliest days of photography he had been especially interested in the permanency of its productions, and had hailed, as we have recently remarked, the advent of carbon with especial delight as tending towards the end he had so long sought. The observation from time to time of a change in the tint of carbon prints caused him much anxiety. Less than a couple of years ago he sent negatives of the various members of his family to the Woodbury Printing Company to obtain permanent prints of them; but these, unfortunately, have lost their bloom and freshness, and fallen into the sear and yellow leaf. The effacing finger of the destroyer seemed to be placed upon every production of photography, as though in relation to all it was written, "Come like shadows, so depart!" He found, however, as our readers know, that the change was in the transfer paper, and not on the image itself. Subsequent investigation has shown this tendency to be confined chiefly to certain German papers. A number of samples from a Scotch manufactory, that of Messrs. Cowan and Co., have shown little inclination to change; one specimen made from Esparto grass has not shown the slightest change under a long trial.

A somewhat startling suggestion seems to flow very naturally out of an investigation of this kind issuing in the discovery that so many samples of paper change colour and become yellow. One naturally asks the question, were all papers used for silver prints free from this tendency? The efforts of careful and skilful photographers have of late years been especially devoted to the production of permanent silver prints; but with heart-breaking lack of success. Do what they might, a large number of silver prints, produced with never so much care, rapidly lost their early bloom, and became dull and yellow in the lights, and greenish looking in their half tones and middle tints. Now this is just the legitimate effect of the paper itself turning yellow. The lights of the picture would of course be yellow, and the middle tints, consisting of a delicate purple superposed on yellow paper, would give the uncomfortable green tone so suggestive of fading. In very few instances did a picture really fade away and disappear: it simply lost its purity and freshness. In silver printing, as in carbon printing, the albumenized surface of the paper in the one, and the gelatined transfer paper in the other, would tend to increase any yellow effect. It seems just possible, therefore, that in some cases the change in silver prints has been due solely to change in the tint of the paper upon which they were produced, and not to an imperfect hypo bath, or insufficient washing, or other of the half-known sources of chemical change in a silver print.

It is certainly matter for regret that, in relation to an art industry so important as photography has become, so little has been done to produce paper especially suited to its exigencies. The early photographers had, at least, a wider choice than those of the present day. There used to be two or three English papers, and two or three Continental papers, each suited to especial purposes in photography. Besides the Rives and Saxe now in universal use, there were Canson Frere's French paper, and Turner's and Whatman's English papers. Some years ago an English paper maker stated, at a meeting of the Photographic Society, that he should regard it as the blue ribbon of his profession as a scientific manufacturer if he could produce a paper just suited to the necessities of photographers. Nothing came of it, however. We recently met the gentleman again at a dinner table, and reminded him of the circumstance. His reply was that the prospects of silver printing were so soon changed by the advent of carbon that he had not been tempted to pursue experiments; but expressed a wish to meet, if necessary, the requirements of the newer method. The field is a wide one and worth the attention of many manufacturers, and it certainly demands the attention of some one to produce a trustworthy article, which shall not change in tint within a reasonable time. The production of such a paper would be a remunerative industry, and would prove a great boon to photographers.

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INFRINGEMENT OF PHOTOGRAPHIC COPYRIGHT BY ILLUSTRATED JOURNALS.

An old grievance to photographers of long standing and constant repetition, is the reproduction of their works, without permission or acknowledgment, in illustrated journals. In one sense, such copying is a compliment to the excellence of the work, just as imitation is said to be the sincerest flattery. But such compliments, to be of actual value, should be expressed, not implied. Few photographers would refuse permission to the proprietors of an illustrated paper to make use of a photographic portrait as the guide for an engraved copy, if the simple and honest course were taken of asking for such permission, and promising to acknowledge the source. But it is the contemptuously high-handed manner in which a suitable portrait for the purposes of the engraver is selected and copied, line for line, the design and composition as a picture being reproduced as well as the details as a likeness. The character expressed in a photographic portrait, the expression, treatment, and general excellence, which give it its value to the engraver as a guide, are the result of the skill of the photographer, and ordinary courtesy and fair play would indicate the propriety of acknowledgment, if the law had not provided for it. As a rule, these principles of courtesy and fair play are deliberately and consciously outraged; but we imagine that few of the offenders are familiar with the fact that a statute exists giving the photographer a copyright in his work, and rendering it penal to "repeat copy, colourably imitate, or multiply for sale, hire, exhibition, or distribution," the work of the photographer without his consent.

Our attention has been directed to a recent example of this common mistake. Mr. H. P. Robinson had produced and published an exceedingly characteristic and excellent photograph of Canon Hoare, of which a very good copy executed on wood was issued in a Church publication entitled *Church Bells*. As no permission was asked, and no acknowledgment made, of the original source of the portrait, Mr. Robinson wrote and remonstrated against the infringement of his copyright. We subjoin the answer received:—

"August 19th, 1878.

"Sir,—The Proprietors of *Church Bells* have called on me with respect to your letter about a photograph of Canon Hoare. Allow me in the first instance to state that they had not the least intention of injuring the sale of your photograph, nor do they even admit having done so; it is hardly likely that a person wishing a photograph would purchase a penny paper instead!

"In a large number of instances the portraits in *Church Bells* are produced from photographs supplied by relatives or friends, and if Canon Hoare chose to have his portrait taken by you, I do not see how this can possibly give you a copyright; it would be something like saying a man has no power over his own face; but if you think so seriously about the matter as to place it in your solicitor's hands, I have no doubt that the Proprietors will be prepared to contest the question.

"The Proprietors would be willing to give you a short paragraph or advertisement stating the photograph is to be had of you.—I remain, yours truly, "W. Wells Gardner."

"Mr. H. P. Robinson."

It will be seen that no apology or regret is expressed, but an attempted defence, on the supposition that Canon Hoare might himself have supplied the photograph for engraving. There is a further assumption that the possible loss of sale is the only supposable injury to the original artist. Mr. Robinson deals especially with this point in his reply, which we subjoin;—

"Tunbridge Wells, August 21st, 1878.

"Sir,—The loss of any sale you may have caused of the portrait of Canon Hoare by reproducing it in *Church Bells* is of no consequence to me; but I contend for the principle that no one has the right to seize my property and use it as his own, without my permission.

"You seem to be entirely ignorant of the Copyright Act as applied to photographs; indeed, from your letter, I should scarcely think that you were aware that such a thing existed. It does not matter that you 'do not see' how the fact that Canon Hoare had his portrait taken by me can possibly give me a copyright in the picture. It is enough for me that the portrait is my registered copyright, legally secured to me as the Act directs. It is, in fact, as much my property as *Church Bells* is the property of its proprietors; or, to give another illustration, as much my property as the handkerchief is of its owner before the pickpocket, whether ignorant or not of the law, possesses himself of it.

"I have never refused permission to have my pictures engraved when proper application has been made to me. My objection is to having the pictures reproduced as a matter of right. I am sorry to say that religious papers are those most frequently guilty of this misappropriation of other people's property. I do not care in my own particular case, but I fight for my profession. If you will read the Copyright Act, so that you may err *with* knowledge in future, if you err at all, and will give the names of the photographers of the portraits you reproduce I will allow the matter to drop. I should be glad of an early reply.—Yours truly, "H. P. Robinson."

"Mr. W. Wells Gardener."

The reply to this is manifestly intended to be conciliatory, but manifests a curious misunderstanding of the gravamen of the offence. Mr. Robinson responds briefly, but incisively, and with his letter, so far as we know, the matter rests:—

"2, Paternoster Buildings, London, E.C., August 24th, 1878.

"Dear Sir,—I am obliged by your courteous letter respecting the portrait of Canon Hoare. Your interpretation of the Copyright Act is widely different to mine; and I regret, both for your sake as well as my own, that it is in so unsatisfactory a state. If you would like to forward me a list of your photographs, and there are any that would be suitable for *Church Bells*, the proprietors will be willing, when they mention the source from which they obtain the portrait, to mention also that of Canon Hoare.—I remain, yours truly, W. Wells Gardner."

"Mr. Robinson"

"August 29, 1878.

"Sir,—I am obliged for your letter, which is, however, not a very satisfactory answer to mine. I do not see why it should be necessary for me to send other portraits for you to engrave to give the proprietors of a religious magazine an opportunity of being honest. I should have thought they would have been quite eager to make an opportunity for themselves, and in future acknowledge their indebtedness to photographers.

"The enclosed correspondence on the copyright of one of my pictures, from the Photographic News, will perhaps enlighten you on the Copyright Act, which you do not consider satisfactory, and I must inform you that I intend to make use of our present correspondence in the same manner, for the information of photographers.—Yours obediently, "H. P. Robinson.

"Mr. W. Wells Gardner."

There is nothing very novel in the transaction beyond Mr. Robinson's manly and spirited maintenance of the rights of photographers against a common form of poaching. Such a contest is always uncomfortable, and often profitless, for the law is costly and uncertain; for although in such cases the statute is clear, and the remedy obtainable by summary procedure, its application is always attended with worry, and a possibility of loss through some of the innumerable loopholes of escape. Nevertheless, if every member of the profession would, at personal trouble, maintain its rights and privileges, much would be done to maintain the claims and status of the art and its devotees—claims too often ignored, or regarded with contempt.

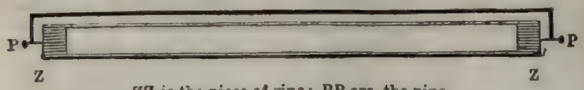
A NEW APPARATUS FOR ALBUMENIZING GLASS PLATES.

BY NELSON K. CHERRILL.

I always now use albumenized plates. I believe every other photographer would do the same if he gave the thing a fair trial. The objections I have heard urged to this process are twofold: first, that the albumen injures the bath; and, second, that it is a troublesome operation to apply it successfully. Now one of these objections covers the other. The albumen coating does *not* injure the bath, unless it be applied to the back of the plate as well as to the front, or, in other words, unless it be slopped about so as to come in contact with the back of the plate; and it is, according to some modes of procedure, rather troublesome to avoid getting some of the albumen on the back of the plate, and, at the same time, to avoid bubbles, and get the coating nice and even.

By the very simple apparatus I am about to describe, the plates can be albumenized at the rate of five or six per minute, with a perfectly even film, and without the smallest chance of a drop coming in contact with the back, or even the edges of the plate.

The apparatus consists of a piece of glass tubing, the larger the better—say about an inch in diameter will do very well; the length of the tube must be greater than the width of the glass by a convenient amount—say an inch or two. In the ends of the tube are to be nicely fitted two corks (the projecting parts of corks may be cut off level). Exactly in the centre of each cork is now to be fixed a common pin. A piece of stout sheet zinc about four inches wide, and a trifle longer than the glass tube, or roller, as it has now become, is to be turned up each end, as shown in the cut. A nick made with a file in each of the upturned ends will serve as a "bearing" for the pins, and prevent the roller running off when used. This is the whole apparatus.



ZZ is the piece of zinc; PP are the pins.

The glass tube or roller is shown in position. How it is to be used now follows:—Wash the zinc, and put it into a flat dish; wash the tube, and put it on the zinc, in its proper place, as shown in the cut. The dish should be clean to begin with. Pour the dilute albumen into the dish, and, by means of one or two little wedges of wood (or bits of paper rolled up tight), so arrange the level of the surface of the solution that it shall come straight along the under side of the tube, immersing the tube a very little (say a quarter of its thickness, it does not very much matter how much, so long as it is not too much). One or two trials will soon show where it should come. Now take a plate up (with pneumatic holder in preference), dust the surface with a brush, and then draw the surface once over the roller; in so doing you will spread a beautifully even coat of the albumen mixture on the glass. The operation can be repeated as rapidly as the plates can be taken up one after another, just dusted, drawn over the roller, and stood up to drain. Ten seconds admits of this being done with deliberation. After a little practice, five seconds will suffice for small plates. I am particular about the thing being quickly done, because I can't see how it can be ill done with such an arrangement. The roller refuses to pick up air-bells, and so it only transfers the clear solution to the glass, and it is next to impossible to get any of the stuff on the back of the plate; it does not even go on the edges, but only on the face, where it is wanted.

It will be noticed, from the above paragraph, that I albumenize the glasses after they have been dried, and not, as is so often recommended, when they are still wet with the washing water. I prefer my own way, though the same plan could be used with wet glass. The chief reason why I prefer the dry glass is that, by so working, it becomes almost an impossibility for any of the albumen to get on the back or edges of the plate, which is by no means the case when the glasses are used wet.

This mode of working also falls in better with my regular plan of operations than any other. I may, perhaps, briefly refer to the whole procedure as I work it.

The glass plates, when new, and if free from rouge, are simply wiped, dusted over, and albumenized without any further preparation. I generally do a large number at a time, say one or two gross. These are packed up, when quite dry, in parcels of about two dozen in each. One parcel at a time is put out on the dark-room shelf. There is a pan in the dark room, half full of water, in which all failures are put, and as often as this pan is emptied the plates washed (the films being put into a wide-mouthed bottle for future reduction). The plates are then wiped dry, and put on the shelf ready to be albumenized with the next lot.

I am trying how dilute the albumen can be made for it still to confer its valuable qualities to the plate. I use, as a standard, the whites of four eggs in a twenty-ounce bottle, which is filled up with water (of course, after beating the eggs and adding ammonia). Six drachms of this in twenty ounces of water gives very good results; but I believe far less would suffice. This, however, I have not tried as yet.

I forgot to mention that when the albumen is poured out into the dish, I add a little ammonia, about half a drachm to a pint; this prevents the solution running in greasy patches when the plates are stood up to dry.

PHYSICS IN PHOTOGRAPHY.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

In taking a retrospective glance at the remarkable phenomena exhibited in photography, an endeavour will be made to explain them, as far as possible, by the light that may be thrown upon them by modern research, and at the same time to suggest extensions which probably may be given to this branch of science by further investigations. We may, perhaps, be open to rebuke from some for venturing to call photography a science; but surely as long as there are problems in it to be solved, which require direct scientific solution, and which, perhaps, indirectly lead to the research in other directions, so long, at least, must it be something beyond a mere industrial pursuit. It is not the fashion to deny to electricity the honourable distinction of being a science, although it has become an industry in its application to telegraphy; why, therefore, it should be considered correct to consider the study of the chemical action of light upon compounds as something to be remitted to the intellect of those who are merely interested in it commercially, it is difficult to understand. It would surely be much better that men of science, who employ photography in their laboratories and observatories, should endeavour to understand the science of attack with the weapon they are using, instead of regarding it as a simply mechanical agency, which is only worthy of the attention of, perhaps, a half-educated assistant. If our men of science, who employ both, were to be as ignorant of the principles of electricity as they too often are of those of photography, research would be very much restricted in its results; and it may, it is believed, be said, with truth, that a familiarity with even the first principles of photography would very much extend it. We may remark, by the way, that to instil a love of science into youth, an education in photography would seem to be of great value, as experiments can be made which have a real meaning to the experimenter, and which, by allowing an almost endless variation, offer an unlimited field for the exercise of the reasoning faculties. A study of photography, in short, must encourage the study of chemical and physical sciences, if a distinction may be made between the two.

Photography must undoubtedly be divided into two distinct branches: the direct production of the visible image by light itself, and the development of the invisible image by chemical means. The recognition of the former we owe to Wedgwood, and of the latter to Daguerre. The discovery of the former is much less remarkable than of the latter, since, without any particular research, a discolouration of a compound by light must have been noticed, whereas the development of an invisible image would have been a matter of theoretical reasoning, unless accident showed its feasibility. We know that the development of Daguerrean images was discovered accidentally by Daguerre and we also know that the development of the image on paper was discovered accidentally by Reade. Without two such wonderful strokes of good fortune the growth of photography might have been retarded for years. The years which succeeded the discovery of the developable image were productive of research into many of the phenomena exhibited by the action of light on sensitive compounds, and, owing to the great intellects who gave their attention to it, many important problems in photography were solved. Succeeding these years, however, were others in which little was done in the absolute science of the subject, though great progress was made in perfecting the processes which had been brought forward. Within the last few years a fresh start in research in all directions seems to have been made, and much that is valuable in elucidating the correct theories on which photography is based has been demonstrated, and it is to this to which attention will be drawn.

With the risk of being tedious, ground which has been well trodden must once again be briefly gone over, in order to estimate the progress which more recently has been made. Scheele, the Swedish chemist, as is well known, found that the blackening of silver chloride (which was the basis of Talbot's pictures) gave up chlorine on exposure to light, thus proving, as it were, that the blackening was due to the formation of a new chemical compound. As far as can be traced, not much more was known regarding this compound; but it was a generally received notion that it was a sub-chloride of silver; and, up to the present time, we find that such is the accepted opinion. In the second edition of Hunt's "Researches on Light," published in 1854, at p. 79, a remarkable experiment is noted. He says:—"The exposure (of silver chloride) in the water was, in another case, continued for several days, but no greater degree of darkening occurred; but a curious fact was noticed. It was found that during the night nearly all the chlorine which had been liberated during the day was recombined, and that the darkening powder became lighter." . . . . He then, after recounting other experiments, says (p. 123):—"From other experiments I am inclined to believe that the first action of the solar ray is to liberate one half of the combined chlorine, which is very readily, moisture being present, replaced by oxygen. By the continued action of the exciting cause the oxide is decomposed, and metallic silver in a fine state of division is formed over the surface" (of the paper).

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* *Nature.*

P. 125:—"The absorption of oxygen, or rather its combination, with the decomposing chloride is proved by another very easy experiment. Some pure chloride of silver was arranged in a bent tube closed at one end, and the other end immersed in a bottle of distilled water. In this state the chloride was exposed for many days to the action of sunshine, during which time it was frequently shaken for the purpose of exposing the whole of the powder and its influence. As the chloride darkened, the water rose in the tube, and it gave a precipitate of chloride of silver on the addition of the nitrate, thus appearing to prove the substitution of oxygen for chlorine under the agency of solar radiation. It was quite evident that some absorption of atmospheric air had taken place. This explanation will also serve for the iodide, bromide, and some other salts of this metal (silver)."

This last experiment has lain fallow for years, and it is only recently that it has had any meaning beyond that indicated in the quoted paragraph. It must be borne in mind, however, that the visible change in the chloride is here under consideration, and that the invisible effect of light was not mentioned.

With regard to the developable and invisible image, till within the last few years, it was a debatable point as to whether the action of light on a sensitive compound was really a chemical change, or simply a physical action; one school held that the sensitive compound was not altered in composition at all, but that in some mysterious manner the atoms of the molecules composing it were shifted, and possessed a new property which was denied to it in its original form. Diagrams were introduced to render this subtle change clear to the student, one of which is reproduced (fig. 1).

In A, we see two ovals slightly differing in size, each of which was intended to indicate one of the atoms composing a molecule of the sensitive salt. When the ovals coincided, the molecule was supposed to be in the ordinary state, but after light acted upon it for a certain time, the ovals occupied the positions shown in B, and after a further action of light they occupied the positions shown at C, in which it again became incapable of proper development, and gave rise to what was known as *solarization*, the part of the *latent image* formed by these solarized molecules refusing to *develop*. By solarization was meant the phenomenon which occurred (more especially if silver films containing iodide were used) when any portion of the plate received a lengthened exposure to any very bright part of the lenticular image, such as to that of the sky. In solarization we have a term which is as unmeaning as is "polarization" in some of its applications, but since it has passed into the technical language of photography, we are bound to employ it. By the term "latent image was meant the invisible (and usually) developable image impressed upon a sensitive film, and it will be used, where convenient, with the reservation, once for all, that its applicability is not admitted any more than is the term "developer" as applied to a solution which may cause the deposition of metallic silver from a solution of silver nitrate; since such a solution is effective, whether applied to an exposed sensitive film or not. The advance of photography has literally been impeded from the neglect of using accurate language. As regards this peculiar condition which the molecule was supposed to have attained after its impact with light, there seems to be no ground for its adoption. The idea seemingly arose from a supposed necessity which existed for a difference in condition between the visible and the merely developable image. By a strictly logical inference there need be no difference between the two, beyond this, that there should be a difference in the number of molecules absolutely altered, and in no other respect. Perhaps the most telling experiment giving direct evidence of the similarity of the two images was that made by Poitevin, in which he proved the dissociation of iodine from silver iodide, by placing metallic silver in contact with the film. After exposure to light, on separating the two, he found that the latter had absorbed iodine, as proved by treating it with mercury vapour. The *circumstantial* evidence of the truth of the chemical theory of the invisible image, however, is so strong, that on that alone we are bound to accept it, at the same time we are not prepared to say that there are not other physical forces which must play a part in its development; in fact, it must be so. We may say, then, that at its first formation the developable photographic image is formed by the reduction of the sensitive compound to one of a less complex nature. Thus silver chloride (argentic chloride) is reduced to silver sub-chloride (argentous chloride) with the liberation of chlorine; and silver bromide to silver sub-bromide with the liberation of bromine; and so on.

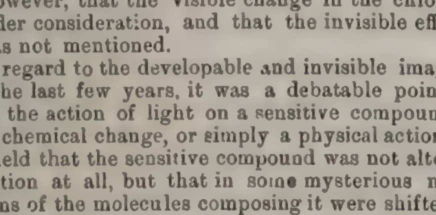

Fig. 1.

We must now allude to the development of the photographic image. We may divide the methods of development of the image on silver compounds into three: (1) The condensation of mercury; (2) the deposit of metallic silver from a soluble salt of silver by means of a reducing agent such as ferrous sulphate; and (3) the reduction of the sensitive salt of silver itself to form the image.

The first method is the earliest, dating from the discovery of the Daguerreotype process, and till within very recent times the reason of its efficacy has been a subject of controversy. Quincké has lately thrown a light upon it in one of his memoirs, and his explanation seems to account for it in a most perfect and philosophical manner.

In the Daguerreotype process, it will be remembered, a silvered plate is subjected to the vapour of iodine (or of iodine and bromine), and thus receives a fine layer of a compound which is sensitive to light. When a plate so prepared is exposed to a lenticular image in the camera, the light causes the iodide (or bromo-iodide) of silver to throw off iodine (or this together with bromine), which is immediately seized by the silver beneath, and thus forms a deeper layer of the sensitive salt. The depth, almost immeasurable though it be, depends on the intensity of, and length of exposure to, the light. (That this is the case has been proved by the fact that if the sensitive layer be removed by a suitable solvent, the surface beneath is shown by reflected light to be etched to a greater or less degree.) The invisible image thus formed is exposed to mercury vapour, and the dew condenses on it proportionately to the depth of the layer. Quincké, in his memoir "On the Edge Angle and Spread of Liquids on Solid Bodies,"[*] shows that the edge angle of a drop of liquid on a solid body varies from zero to a constant quantity, according to the thickness of any fine layer of impurity which may be on the latter. When this layer attains a certain value, then the edge angle of the drop will remain constant. The thickness—or, rather, the thinness—of the layer may be appreciated when it is stated that it bears a relation to what is called "the radius of the sphere of sensible action of molecular forces, and is usually greater than ·00005 millimetre. In this case the sensitive plate is the solid body, and the invisible image forms different thicknesses of impurity. By this difference in the edge angles of the mercury dew, condensed on different portions of the latent image, the light is reflected in different ways, which gives rise to the visible image.

This explanation entirely does away with the necessity, which previously seemed to exist, of the silver iodide (or bromo-iodide) being reduced to the metallic state, in order to cause condensation, or—perhaps it might be said—to cause the formation of an amalgam of mercury and silver.

The next method of development speaks for itself; the metallic silver is deposited in fine granules, and is attracted by the salt, which has been altered by the influence of light. Perhaps further investigation will show that development is dependent on what is known as the Brownian movement, or the rapid movement of small suspended particles in a liquid. If this movement be dependent on the electrical condition of the neighbouring body, as has lately been supposed, and if, as Dewar has shown, the condition of an exposed sensitive salt is electrical, then the deposition of the metallic particles of silver on the image is accounted for in a satisfactory manner.

The last mode of development is principally employed with silver bromide, and is known as the alkaline method. When a film of collodion or gelatine holds a sensitive salt on a plate, the portions exposed to light are reduced to the metallic state by the application of an oxygen absorbent, such as alkaline pyrogallic acid. Since the image is invisible, it must be remembered that but a few molecules of the sensitive salt are reduced by the action of light to the less complex and developable form, we therefore must look for some further action between the developer and the rest of the unaltered compound. It has lately been proved that silver bromide or silver chloride cannot exist in *close* contact with metallic silver. It invariably forms the developable salt. Thus, if we take a glass plate, silvered by any of the well-known processes, and expose it to the fumes of bromine or to hypobromous anhydride, it will be found that it is impossible to secure a film of argentic bromide until the last trace of silver has been attacked, after which the true colour of argentous bromide gradually gives way to the well-known colour of argentic bromide. We may try the experiment with bromine water, and the same holds good. The action of chlorine on silver is the same as of bromine, but the action of iodine seems to be different, the fully saturated compound, argentic iodide, being formed at first. In other words, this compound is the more stable, than argentous iodide.

Now the alkaline developer, when mixed with a soluble bromide of an alkali, has the property of much more readily attacking the argentous than the argentic bromide, presumably because the soluble bromide used in development combines with the former, giving rise to an apparently difficultly reducible compound, whilst it refuses to combine with the argentous salt. It is thus easy to see, if this property of the developing solution be connected with what was stated in the preceding paragraphs, how development takes place. The developer is applied to the exposed film, and the minute quantity of argentous compound is reduced to the metallic state, and at once this particle of silver, which is in close contact with the unaltered compound, combines with it and forms new argentous bromide. This is ready for attack by the developer, and thus the action spreads till the whole thickness of the sensitive salt is reduced to the metallic state where the greatest exposure has taken place. An interesting result[*] of this action is afforded by the fact that, if a film of unexposed argentic bromide be superposed over one that has been exposed, the image impressed on the latter can be developed in the former so long as close contact is secured. It has been said that this action is due to the solubility of the silver bromide used in the alkaline development; and, to some extent, this is true; but it is evident that this cannot be explanatory of the whole phenomenon, since the same effect is produced by using, with the pyrogallic acid, potash as the alkali in which the silver bromide is absolutely insoluble. We have been thus particular in showing the cause of this alkaline development, as it explains some phenomena to which attention will subsequently be called, and which otherwise would be inexplicable, except by reversing usually accepted physical laws.

(*To be continued.*)

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LIGHT AND SHADOW.

BY J. MARTIN.

DESIGN, as confined with mere outline, although it may give, with true proportions, size, and various conformations of the objects delineated, leaves the eye of the observer very unsatisfied, and is, in fact, little better than a diagram, plan, or map. Even builders require three different drawings; viz, ground plan, section, and front elevation. The latter is a drawing of the front of the building as it will appear when finished. But the architect could not accomplish his purpose by outline only, and, therefore, it introduces shadow to give relief to projections, such as cornices and pillars, and frequently, also, adds colour, to show more particularly the nature of the materials used in the work. Again, design as applied to architecture, and artistic design, vary most essentially in execution. The builder works with rule and compasses, and requires even the minutest parts to be drawn to scale, so that an estimate of the cost of the various materials used can be made out, and a tender given of the price at which it can be executed. The artist, on the contrary, works by the eye only, leaving out much tedious detail, which, in fact, would be impossible and useless to introduce into objects at a distance, and trusts to general effect, always choosing the most favourable point of observation. And herein lies the great distinction between artistic and mechanical design.

Seeing, then, that light and shadow are so necessary to complete the pictorial effect of the simplest design, and that a want of the knowledge of its laws leads photographers to introduce not unfrequently into their compositions such gross and ridiculous blunders, I think it may be of service to many if you will allow me to give, in addition to what I have already said, a few hints on the laws of light and shadow.

Shadow is produced by the obstruction of rays of light falling upon any opaque object; and were it not that these rays are reflected and refracted more or less from all objects whatever, we should not be able to see any detail of the dark sides of anything, or into recesses, caves, or tunnels. The brighter the light, the more sharply defined and darker is the shadow thrown from the object upon which such light falls.

Light is natural (as that of the sun) and artificial (as that produced by the flame of a candle, torch, or fire of any kind). The rays of light given by the sun proceed in straight lines, in consequence of that body being of so vast a size; but the rays of light given out from the flame of a candle, on the contrary, diverge from its centre. Thus we are able to distinguish whether a picture has been painted by natural or artificial light as its source of illumination.

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[*] *Phil. Mag.*, May and June, 1878.

[*] *Phil. Mag.*, January, 1877.

Shadow in a landscape drawing enables us to tell the time of day at which it was taken, as also the state of the weather; and, if given with truth, the height of the various buildings. One of the greatest denials to the use of pictorial background and accessories in studios is that their shadows seldom or ever can be in unison with those of any real object introduced into the picture, and, I may say, never with those of the sitters. Studios are too frequently inadequatly, and hardly ever properly, furnished with appliances for producing, by means of reflecting light, soft and agreeable shadows; and, unfortunately, I have found that the greater number of photographers did not understand their use. It is a great mistake to use too high a side light, as this throws heavy shadows under the brows, nose, and chin of the sitter, and, of course, when placed in a chair, or the person is very short, this effect becomes increased in proportion. I remember an observation made upon a portrait painted by such a light, which was, that the artist should take away pieces of liver from under the nose and chin.

Some years ago I had the honour of photographing an artist of celebrity and his family. I had the pleasure of seeing him many times, and I took the liberty of asking his advice as to the arrangement of the light and shadow of my sitters. His reply was, "Have you any engravings?" Producing a portfolio for his inspection, he selected several, and pointed out why he did so. It was a valuable lesson, never to be forgotten. I cannot, in these few lines, recapitulate all he said, but remember that all the specimens that he selected must have been painted by a low and tending to the front side light. He also made the observation that I should notice the sort of picture with which the public were most pleased, and, if I wished to obtain sitters, that I must conform my works to suit their inclinations.

Shadows in a picture enhance its beauty, give an appearance of relief and reality, and help to make more conspicuous all principal objects; but they must not be heavy. There is no such thing as total darkness supposed to be in nature, but even in the most obscure corners some prominent details of the objects of their contents may be discerned.

I will, with your permission, return to this subject in my next article.

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Correspondence.

COMPOSITION IN LANDSCAPES.

Dear Sir,—The ordinary arrangement of a landscape is generally one-third light, one-third shadow, and one-third middle tint—meaning a semi-obscurity produced by the intervention of clouds between some of the objects and the rays of light which would otherwise be thrown upon them by the sun.

Other sources of light produce in a modifying manner the same effect.

The shadows of a picture greatly tend to enhance the tone of feeling intended to be produced by the composition upon the mind of the observer by the artist. Thus, in a wild rocky Salvator Rosa kind of scenery broad and strong shadows will tend to add to the grand and majestic character of the towering cliffs, deep ravines, and jagged rocks there represented. On the contrary, the gay and joyous character of some smiling pastoral scene is heightened by its being lighted by the full radiance of a midday summer's sun, which, as the sun will be at that time high overhead, must necessarily throw but little shadow. As photography can only copy what is placed before the camera exactly as it then is, it is necessary that the operator should use great judgment as to the time when he takes his negative. Early morning light, and that of the setting sun, will thus be found to give greater sublimity to the appearance of the coast and mountainous scenery. Architectural subjects will have more detail and better defined shadows in full daylight. Of course, where the picture is intended for some special purpose to have a particular effect, the artist must then modify the direction to suit his purpose.

Great difficulty is often experienced by landscape photographers in producing the appearance of a receding plane in the foreground, principally on account of its colour being so uniform as to produce the effect of a wall instead of a receding plane. If possible, oblique shadow should be given to help the imagination of the observer; where this cannot be done, some objects in accordance with the scene should be introduced. I am aware that most, if not all, of the photographic views offered for sale are more or less retouched. In the hands of a capable artist this will often prove to be a great embellishment; but, unless it is well done, it had better not be done at all. Nature has so much to do with the appearance of all objects under the influence of natural light, that a scene almost magical when viewed at proper time and in favourable weather, will appear but a dull, monotonous, everyday affair under contrary circumstances. In this country the colour of the soil, being for the most part red, and covered with green verdure, requires a strong light to give its details clearly, and, I should say, longer exposures than in those where the soil is greyish or white. Therefore, although rules may be given for general guidance, the beauty of a picture must depend greatly, if not altogether, upon the intelligence and artistic feeling of the operator.

With your permission, at an early date, I purpose offering a few observations upon perspective, composition, and colour.—I remain, yours truly,

122, *Queen Street, Newton Abbot.* James Martin.

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Talk in the Studio.

The Photographic Exhibition.—Our readers are reminded that Saturday, the 28th. inst., is the last day on which pictures will be received for the Photographic Exhibition to be opened next month at the Gallery, 5a, Pall Mall East. Alterations have been made in the directions for sending pictures for exhibition. They are either to be delivered by hand on Friday and Saturday, 27th and 28th inst., at the Gallery, at which place no packing cases will be received, or are to be addressed to Photographic Society of Great Britain, care of Mr. J. Bourlet, 17, Nassau Street, Middlesex Hospital, London, W. All packing cases must be sent to the latter address. Further particulars can be obtained from the Assistant Secretary to the Society, Mr. E. Cocking, 57, Queen's Road, Peckham, S.E.

Photographers' Picnic.—A correspondent favours us with the following:—"Mr. Lafosse, of Knolls House, Manchester, on Saturday, September 7, gave his staff of assistants a very pleasant picnic. They started very early in the morning, filling the 'bus inside and out, for a journey of fourteen miles to a pretty little spot called Alderly Edge. The day turned out beautifully fine, and the drive charming. They arrived at the hotel just in time for dinner, to which all did ample justice, everything being of the finest quality, and reflecting great credit on the host. Dinner being cleared, Mr. Batho proposed the health of Mr. Lafosse, seconded by Mr. O'Reily, who, in an able manner, spoke of the great respect and esteem in which Mr. Lafosse was held by the whole of the staff. Mr. Lafosse, in responding, spoke very eloquently of his assistants, calling them his friends, and passing high encomiums on them all. The party then started for a ramble, visiting the old spots known to visitors, the Wizard Cave and Wishing Well. After tea the evening was spent in singing and dancing, all returning home thoroughly pleased and refreshed with the day's outing."

To Correspondents.

W. S. B. (Newgate Street).—The circular marking in your negative is probably due to something in your camera or lens which casts a shadow or interposes between the image and the sensitive plate; or it possibly may be something which casts a shadow on the background. Look for it carefully on the ground glass. The individual case sent might have been a smear on the plate given with the final polish, but the recurrence of the same thing makes the first suggested causes most probable.

John Wilson.—We have found that a sizing with a solution of isinglass in gin, made by the aid of heat, answers well for preparing prints for oil painting. We cannot give you a formula, because we made it by rule-of-thumb, as thin as possible so as not to crack or give a harsh surface, but thick enough to prevent the paper absorbing the oil or medium used.

R. B.—Your letter was mislaid and overlooked. There are various modes of securing great intensity in negatives of line engravings. In the first place, get the negative as clean and brilliant as possible, and with good normal intensity. Then fix, and, after washing, apply a ten-grain solution of bichloride of mercury until the negative presents a uniform grey tint; then wash and apply a one-grain solution of iodide of potassium; again wash, and if the intensity is still insufficient, proceed to intensify further with pyro and silver, which will readily secure almost any amount of density. If you wish to try Selle's intensifier, proceed as follows:—Take—

Ferridcyanide of potassium ...	20 grains
Water	1 ounce

Dissolve, and mix with a solution of—

Persulphate of uranium	20 grains
Water	1 ounce

This mixture is a clear solution of a deep red-brown colour, and, poured over a finished and washed negative, it at once changes the deposit into a rich non-actinic chocolate-brown tint, and, if its action be continued, into a purple brown or warm black. The rich, deep, warm brown at once assumed, or the deeper purple-brown, approaching black, produced by a continued application, appears to us best suited for collodion transparencies, but it gives an intense negative also. The solutions should be mixed when required for use.

B. L. M.—We have found the non-actinic silk and muslin sold by Mr. Solomon answer well. You can dry paper and fabrics of a non-actinic colour with chrome salts. Proceed as follows: "The material, of cloth, is first carefully washed and freed from all impurities; it is then immersed in the following bath:—

Acetate of lead	6 ounces
Water	12 „

When thoroughly impregnated with this solution, all excess is pressed out, and the cloth is then allowed to dry; after which it is placed in the following solution:—

Bichromate of potash	3 ounces
Water	2 quarts

It is then rinsed and dried. A deeper dye can be obtained either by increasing the lead salt in the first bath, or by repeating the operation of drying two or three times."

J. S. C.—You may write on the negative with a soft pointed quill pen, or a fine sable pencil, using opaque water colours for ink, and reversing the letters, of course. This, then, will print white. 2. A wooden dish, well coated with pitch inside, will serve for fixing solutions.

Fountain Brothers.—Col. James' work on Photo-zincography was published, we think, by Longman. We forget whether the price was 12s. 6d. or 21s. It is, we believe, out of print.

J. Grant.—There is no varnish suitable for card pictures. The effect of varnish on a paper print is not satisfactory. In the enamelling process the use of a perfectly clean piece of plate glass is the best aid to the enamel surface separating easily. A previous treatment with wax is often used.

A. Le Fournier.—The print is softened by soaking in water, and is then rubbed into the concave side of the glass. See descriptions of process which we have published.

H. W.—We know of no other method than applying to the author of the paper at his address, "The Cedars, Putney, S.W."

A. C.—We will ascertain when opportunity serves. Common unbleached calico would answer.

E. Benthin.—You rightly conjecture that a rich black polish is of vital importance in securing good results. A buff covered with white cotton velvet, or, better still, a piece of fine soft wash-leather thoroughly cleansed before covering, and rouge for polish, always gave us a fine black surface, assuming that the plate was well cleaned and roughly polished first. An electro-plate surface is a great advantage. Do not think of abandoning the gilding process; it is of the utmost importance for beauty, and imperative for permanency. Stains or clouding in that process generally indicate uncleanliness somewhere. Be particular that your distilled water is clean, and that the nozzle of your gilding pliers is quite clean, and the hypo solution clean and well filtered. What formula do you use for making your gilding solution? It is imperative that your buffs be kept dry. We used to have a box for the purpose with a funnel of tin passing through from bottom to top. A spirit lamp was kept within the funnel at the bottom, which made it hot, and perforations in the top of the box allowed damp air to escape when it became heated. The image on the Daguerreotype plate appears to disappear if kept long before development. Of course, if you took your developing box with you, and developed immediately after exposure, you would have no difficulty. We always returned the plate to the iodine for a few seconds—often very few—after it left the bromine box. We never tried the method of cleaning the plate by boiling water on its surface. For a first cleaning of a somewhat dirty plate it might answer, but we prefer alcohol and tripoli. The method we recommended does not require any longer exposure than usual. We can understand the want of sympathy in the process of many who have never tried it, and have not really properly graduated in photography. Write earlier in the week when you write again. Your letter reaching us on the day we go to press risks receiving a hasty answer.

Several Correspondents in our next.

METEOROLOGICAL REPORT FOR JULY.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven, 36 feet above sea-level.

Date.	Barometric Pressure. Morning	Barometric Pressure. Noon.	Barometric Pressure. Night.	Temperature in the Shade. Morning	Temperature in the Shade. Noon.	Temperature in the Shade. Night.	REMARKS.
1	29·88	29·88	29 87	64°	67°	58°	Fair and sunny
2	29 83	29·83	29·87	58	64·5	56	Fair and sunny
3	29·96	29 96	29 82	—	—	59	Fair, but cloudy
4	29·96	29·96	29·90	62·5	64	61	A little rain this afternoon
5	29 87	29·80	29·79	64	64	61	Rain this afternoon and evening
6	29·79	29·84	29·86	63	69	61	A little rain this afternoon and evening
7	29·86	29·88	29·89	60	64	60·5	Fair and sunny
8	29 98	30·00	30·01	62	64	60	Fair and sunny
9	29·99	29·82	29·88	61	63	58·5	Showers a.m. and p.m.
10	29·87	—	29·78	61	[illegible]	59	Showers this forenoon
11	29 72	29·73	29·73	58	62	58	Showers this morning
12	29·76	29·78	29·80	60	64	54	Fair, generally cloudy
13	29·87	29·90	29·96	60	65	50	Fair and sunny
14	29·98	30·02	30·07	60	67	59·5	Fair and sunny
15	30·08	—	30·11	62	66	61·5	Fair and sunny [this evening
16	30 1	30·18	30·18	62	68	64	Fair, but generally cloudy. Very sultry
17	30 18	30·19	30·22	66	70	66	Fair, generally sunny
18	30·27	—	30·25	67	68	64	Fair and sunny
19	—	30·15	30·08	69	75	65	Fair and sunny
20	—	30 00	29 98	68	70	69	Fair and sunny
21	29·98	29·98	29 96	72·5	78	68	Fair and sunny
22	29·92	29·85	29·78	69	76	67	Fair and sunny
23	29 62	29·60	—	—	—	—	Fair and sunny
24	29·57	29·52	29·57	58	71	66	Rain a.m and p.m.
25	29 58	29·60	29·61	64	70	61·5	Showers a m. and p.m.
26	29·62	29·67	29·70	62	65	61·5	Fair and sunny
27	29·76	29·82	29·86	61	65	56	Fair and sunny [thunder heard
28	29·87	29·88	29·89	62	66·5	59	Fair, heavy thunder clouds, but no
29	29 90	29·98	30 03	65 5	69	55	Fair and sunny
30	30·12	—	30·02	62	69	59	Fair and sunny
31	30·15	30·26	30·25	59	69	60	Fair and sunny

Summary.	Mornings.	Noons.	Nights.
Highest temperature observed	72°·5 ...	78° ...	69°
Lowest ditto	58 ...	62 ...	54
Mean ditto	62 8 ...	·67·4 ...	60·6

Mean of all observations	[illegible]
Number of fair days	23
Number of days on which rain fell	8
Number of fair days bright	19
Number of fair days gloomy	1

The Photographic News, September 20, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Death of Professor Fischer, of Prague—The Photographic Exhibition—The Statue of Nicephore Niepce.

The Death of Professor Fischer, of Prague.—Another death is recorded from the effects of cyanide of potassium, and this time the circumstance calls for something more than a passing notice in a photographic journal. It seems, indeed, very much as if Professor Fischer has lost his life in his endeavour to be of value to the photographic profession by rendering harmless the deadly poison with which we have frequently to deal. Professor Fischer occupied the Chemical Chair at the Prague High School, or Gymnasium, and it was his idea that cyanide of potassium might be rendered harmless as a drug—or its poisonous effects, at any rate, very much diminished—by admixture in some way with sal-ammoniac, while, at the same time, it could be employed by the photographer with no less efficiency. We suppose from Professor Fischer's action that he had really succeeded in using the mixture for photographic purposes, and it answered as a solvent quite as well as the cyanide solution alone; but on the point of its poisoning properties he appears to have been woefully mistaken. In the presence of his assistant, and informing the latter what he was doing, he raised a solution of cyanide and sal-ammoniac to his lips, calling upon his companion to witness how harmlessly the potion would work. A chemist cannot express confidence in the uninjurious nature of a liquid better than by swallowing some of it, it may be argued; but if Professor Fischer had been an older and more experienced chemist—the poor fellow was but twenty-five years of age—he would hardly have adopted this rather foolish and sensational mode of procedure. However, he is not the first philosopher who has lost his life from overweening confidence in his own work. No sooner had he tasted the mixture than he seems suddenly to have been assured of his foolhardiness, and to have repented of his rashness; he besought his assistant to go at once for medical assistance, but ere this came, it was too late. The subtle poison did its work in a few minutes, and the Professor was in a state of coma before aid was at hand. If a chemist in his laboratory is unable to secure assistance, under such circumstances, photographers must see at once how dangerous is a case of poisoning with cyanide of potassium. We may say, in a word, that there is no antidote for this virulent compound. All that can be done, pretty well, is to employ an emetic at once, and to use the stomach pump. If an emetic is not close at hand—and it rarely is, except in some well-ordered laboratories—the best thing that can be done is for the patient immediately to put his finger down his throat until he touches the tonsils. This will have the effect, in nine cases out of ten, at any rate, of causing him to vomit immediately, and thus the matter may be thrown out of the stomach within a few seconds of its having been swallowed. A dose of warm water, or warm mustard and water, or sulphate of zinc, if it can be secured at once, will renew the vomiting, and if these are administered in time, it is the best thing that can be done for the patient. One patient whom we saw within four or five minutes of his having swallowed by mistake a small dose of cyanide solution was already in a state of coma, with his jaws rigidly set, and all attempts then to get him to swallow an emetic were impossible, unless extreme violence had been used to force open his mouth. He vomited, but not until a minute or two had elapsed; and as he had swallowed the poison on an empty stomach, the solution did its work very rapidly. The use of the finger is, therefore, the only thing that can save one under some circumstances, and photographers should bear this simple means in mind. A physician, the other day, informed us that he made use of the expedient with success when he swallowed a pin on one occasion. He was aware that the instrument might place his life in jeopardy, and without a moment's thought succeeded in making himself vomit. To his inexpressible relief the pin was at once thrown out, and he was once more a happy man.

Photographic Exhibition.—This day week, photographers who intend to exhibit at the forthcoming Exhibition in Pall Mall must have their pictures ready for delivery, either at the Gallery itself, or to Mr. James Bourlet, 17, Nassau Street, Middlesex Hospital, W. Only pictures that are carried in by hand will be received at the Gallery itself, since no packing cases—or, indeed, packing of any description—will be permitted inside the premises at Pall Mall. This regulation, though it will doubtless give the Hanging Committee worry enough, will not entail any trouble upon exhibitors; but it will be necessary that they conform strictly to the rules that have been drawn up for guidance. Although only eleven medals are specified for various works, there is a clause to the effect that "medals will be placed at the disposal of the Judges for any novelty, or other form of excellence, in process or result," so that it is not unlikely that as many, if not more, awards will be made this year. Our readers, no doubt, remember the names of the seven gentlemen who have been selected to form the jury. Their names are Mr. E. J. Poynter, R.A., and Mr. J. Brett. representing painters; Mr. Glaisher, the President of the Society; Mr. Francis Bedford and Mr. H. P. Robinson, two members of the Council; and Mr. F. Piercy and Mr. H. White, two members of the Society. Photographers may congratulate themselves that the two members of Council in question are jurors instead of competitors, as otherwise there would, in all probability, have been two medals the less to distribute. As before, the Exhibition, as well as the medals, will be open to all contributors, whether members of the Photographic Society or not; but, according to a new rule—which will also entail more thankless work on the Hanging Committee, and with little result, we fear—non-members are to be charged one shilling per square foot of wall-space, the minimum charge being five shillings. The Exhibition opens to the public on Wednesday morning, the 9th October, and is to close on the 12th November, the admission being one shilling in the daytime, and sixpence on Monday and Saturday evenings, when the Exhibition will also be open. To members the Exhibition will open as usual on the Tuesday evening (the 8th of October) with a *conversazione* at eight p.m.

The Statue of Nicephore Niepce.—The Nicèphore Niepce statue, to be erected at Chalons-sur-Saône, does not seem to make way, notwithstanding the circumstance that its erection has been canvassed in every direction. We believe a similar attempt to secure a monument for Daguerre, some years ago, failed also to make any progress. In the present case it is the townspeople of Chalons who are fostering the movement, with the Maire at their head, and under these circumstances it certainly does appear strange that the necessary money is not forthcoming. As the monument is to be erected in the town itself, the inhabitants thereof, one would think, would feel interest enough in the matter to subscribe funds for the purpose; but all these worthies have done so far is to issue an elaborately-worded and ambiguous pamphlet, which says very little indeed to the purpose. Everybody has benefited by photography in some degree, and, therefore, everybody should subscribe to Niepce's statue. But what is everybody's business is nobody's business, the Maire and his fellow-citizens should remember, and if there is no chance of collecting funds for a statue among those at home, there is less, we fear, of doing so in foreign countries.

PHYSICS IN PHOTOGRAPHY.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

We have hitherto treated the question of a sensitive compound from what may be called a chemist's point of view, but it has also its physical aspect, and to enable us to understand what has recently been done in photography this latter must be briefly touched upon. To commence with, we are met with a difficulty in nomenclature which ought not to exist. Unhappily, chemists and physicists employ the term molecule in a different sense. The physicist's molecule, for instance, in one place is defined † as "a small mass of matter the parts of which do not part company during the excursions which it makes when the body to which it belongs is hot." To avoid misapprehension the expression molecular group will be used for the physicist's molecule for want of a better, the word particle being rather too indefinite, and being usually applied to a group of molecules of visible size, a state of aggregation which is by no means necessary. The question as to the possible variation of the number of molecules composing a molecular group has not been entered into, as it would be trenching on ground which has been explored by others in relation to a different subject; but this may be stated as a matter of observation, that some compounds of silver which are sensitive to light are capable of forming two molecular groups, one of which absorbs the blue rays, and the other the red rays.

The iodide and bromide are the salts of silver which, either separately or together, are chiefly employed for securing a developable photographic image; and it is these with which we shall principally deal, though the chloride and one or two other combinations will come under review when considering certain new phases in photography. The point to which attention must now be directed are the radiations to which these compounds are sensitive; and these are evidently dependent upon the absorption that takes place in them individually. If we take precipitated silver bromide and fuse it into a crystalline mass, and examine it spectroscopically, we find that it energetically absorbs all rays from the extreme violet to the green, and also less markedly in the yellow of the spectrum; whilst if we place a slab of it before the slit of the spectroscope, and photograph the spectrum of white light passing through it, we find that it completely cuts off the ultra-violet rays; so that we may say that the red and perhaps the ultra-red rays are the parts of the spectrum in which but slight absorption takes place. Now, since absorption means work done in the absorbing body, it is evident that we may expect some action to take place in the silver bromide when exposed to these rays; and the action may be a chemical change, or a rise in temperature, it being remembered that the latter may co-exist with the former, since it may be produced by the result of chemical action as well as by the absorption of the radiation. The question then arises, on what does the possibility of a chemical change in a compound depend? This is a question which is very easily asked, but not so easily answered. It must evidently depend, amongst other things, on the capability of the molecules of the compound to throw off some atom or atoms; or on their capability of acquiring some vibrating atom or atoms of a body with which they may be brought in contact; in other words, that the molecule shall be in a state verging on indifferent equilibrium, and seeking re-arrangement of the atoms when the impulses of the waves forming the radiations impinge against it. Taking for granted that the chemical theory of the formation of the photographic image holds good, we know that the atom of the halogen is thrown off from the molecule of the silver compound, leaving behind two atoms of the metal combined with one atom of the halogen. Thus silver bromide (Ag_2Br_2) is split up into argentous bromide (Ag_2Br) and bromine. If a film of the yellow sensitive salt be exposed to the spectrum, an image is developed on all the parts which it absorbs—in other words, absorption in this case means chemical action. Similarly, with the iodide, where the absorption of radiation is most energetic, there we have a chemical change. With the chloride we have a different phenomenon; crystalline chloride is nearly colourless, and the absorption of every part (though not necessarily of the invisible regions) of the spectrum must be nearly equal; but we find that this salt is sensitive only to about the same radiations, under ordinary conditions, as the iodide. An explanation of this will be offered at a more advanced stage of these articles, but it may be as well to note the fact now. In the accompanying diagram the ordinary results of the exposure of the three chief silver compounds to the spectrum are shown (Fig. 2).

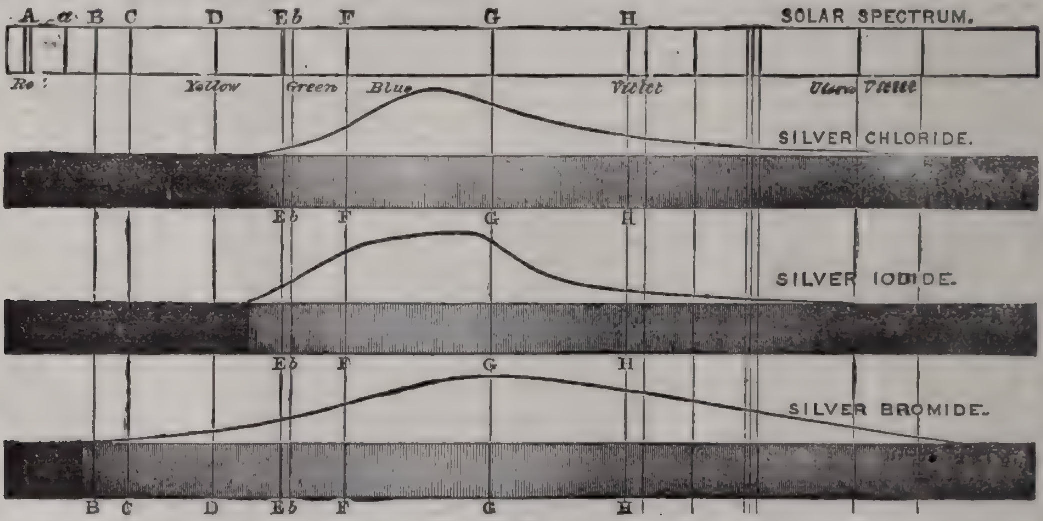

Fig. 2.

When we obtain a molecular grouping in which the red is absorbed, we may expect that the same chemical change may take place as when in the former state. This is not a necessity, since, instead of a reduction to a less complex form of molecule, the new compound, formed by the aid of light, might be rendered more complex by annexing other foreign atoms. An example of this we have in Hunt's experiment, already quoted; where it is evident that the violet subchloride would be sensitive to light if it were proved that light alone caused the absorption of oxygen. Again, in the combination of chloride and hydrogen, when exposed to light, we probably have a greater complexity of molecular structure introduced.

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* *Nature.* Continued from page 442 P.N.

† "Theory of Heat," Maxwell.

In the ordinary state in which silver bromide is formed in a collodion film (we will take this compound, as it is this one which has been principally examined), we have it in the state in which the blue is absorbed and the red transmitted; but there are means by which it may be made to absorb the red. We may obtain the bromide in either state by what is known as the "*emulsion process.*" Briefly, this process may be described as one in which an emulsion of silver bromide is formed in a viscous liquid, such as collodion or a solution of gelatine, by first dissolving a soluble bromide in it, and then adding to it a solution of silver nitrate. The particles of solid bromide thus formed remain suspended in the fluid. In the emulsion with collodion we can get the silver bromide in various states according to the rapidity with which we add the silver nitrate. Thus if we add it rapidly, we get a mass of silver bromide which is coarse and has a tendency to subside, and which, when poured upon a glass plate and dried, gives a film transmitting white light; whilst if we add it drop by drop, and shake it up between each addition, we find that the bromide remains suspended for days, and that a film of it transmits orange light. If we take the emulsion, however, as first described, and place it in a still, and bring it to a state of ebullition, distilling over the ether and alcohol solvents of the collodion, thus breaking up the heavy particles of the suspended bromide, and then wash the contents of the flask in water, to get rid of all soluble salts (which much necessarily exist, owing to the double decomposition of the soluble bromide and the silver nitrate), we shall find, on redissolving the mass, after washing with alcohol, that the film will transmit lavender or a sky-blue light. On the other hand, if the solvents from the emulsion which transmits the orange light be allowed to evaporate spontaneously, and the solid residue be then washed and redissolved, the film will still transmit red light. It will thus be seen that silver bromide may be secured in two states, *in one of which it principally absorbs the blue, and in the other the red.* The chances are that the former is sensitive to the less refrangible rays of the spectrum, whilst the other is only sensitive to the more refrangible rays.

(To be continued.)

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GERMAN CORRESPONDENCE.

BY DR. VOGEL.

The Aniline Process in Germany—New Photographic Optical Patent—Utilization of Old Collodion—Captain Abney's Observations.

I terminated my last correspondence with a few notes about the application of peroxide of iron to photographic purposes in general, and particularly for making tracings by means of light. I mentioned that the method described requires three times the exposure of the silver process. This fact makes the process evidently a failure. The old aniline process, invented by Willis in 1864, has lately become more and more popular. It has the advantage of making directly from a positive original a positive picture. The sensitizing substance is composed as follows:—

Saturated sol. of bichromate of potas.	4 ounces
Sulphuric acid	1½ to 3 drams

Paper is sensitized with it, dried, and finally exposed in a printing-frame under a picture similar to the positive silver process with a glass negative. The sensitive substance will be reduced on all parts where light strikes it, whilst the parts which were protected by the non-actinic lines remain unaltered. These parts contain chromic acid in a free state, and we will have a yellowish picture on a green ground. Exposed to aniline vapours the picture grows dark. The resulting colour is fast, and it is sufficient to wash the print in water in order to fix it. Pictures thus produced have the disadvantage of being reversed, unless the original is on such thin paper that, without detriment to the sharpness of the print, the original can be put with its reversed side in contact with the sensitized paper. Mr. Hoppe, ingénieur, of Berlin, has succeeded in producing also copies of drawings on this paper, in right position, by preparing a thin sensitive paper, and putting the latter with its reversed side on the right side of the drawing. The light has to pass through the tracing-paper before it reaches the sensitive fibre. Since it is very difficult in this process to control the exposure with the eye, Mr. Hoppe uses my photometre, and extends the exposure until it has reached sixteen degrees. The longer he copies, the weaker the picture will be. The light loses much of its intensity whilst passing through the drawing-paper. In order to eliminate this factor, Hoppe covers the photometre with an equal piece of paper, and weakens thus the light on its way to the photometre in the same proportions as it is weakened in passing through the drawing. Hoppe has reached an immense patronage, and produces thousands of pictures with an irreprehensible finish.

An optical invention for the production of stereoscopic pictures in one single picture, taken with one single lens, has recently been patented, and applications for other patents are made in foreign countries, probably also in America. The whole of it represents noting new, and consists in a great illusion, to which so-called inventors, without the necessary scientific judgment, are, unfortunately, too often subjected. The inventor recommends to take a lens large enough to be capable of taking in a stop with two holes instead of one hole in the centre. There is something true about it. For instance, the right edge of a four-inch focus lens will always be a little more to the right side of the observer, and the left edge will always be a little more to the left side. If, now, first, the one side of the lens is covered, then the other, and successively two pictures taken, these pictures will show the roundness of the object if placed in a proper manner in the stereoscope; but it is a great mistake to believe that one picture taken with one lens in which the centre is covered and small portions left open on the edges, is more stereoscopic than any other. On the contrary, this arrangement will produce a pretty good stereoscopic effect on the ground-glass plate, but the finished picture, however, is not in the least more stereoscopic than all others, and has, besides, the great disadvantage of showing double outlines. I observed this seven years ago, and have also tried my best to convince the inventor of the insignificance of his invention. He seems, however, to believe more in his own judgment than in mine, and forgets that, even if his observations were right, the invention would not be of any particular advantage to photographers, as, in stopping off the centre of the lens, the light becomes so weak on the plate, and the exposure proportionally longer, that it is not any more practicable for portrait work. He now offers his new invention for thirty marks (about seven dollars) to our photographers. How much he will ask in England and America has not yet been revealed to me.

There is no doubt that every photographer has experienced that his collodion turns red, and the question has often been brought before meetings, &c., how the old collodion might be brought into money. Many photographers mix with it new collodion, and thus sacrifice a great deal of the sensitiveness of the same; others use it for cleaning plates, where the better would use ammonia. It has been proposed to regain the alcohol and ether from the same, but it would always be impure with acetic acid; besides, it would not pay. A simple way of using it must be welcome, I should say. I use it instead of the alcohol in the developer. After the sulphate of iron is diluted, the old collodion is added instead of alcohol. The cotton precipitates, and is filtered off. The small quantity of iodizing salts which the developer will contain now will not do a particle of harm. It cannot, however, be disputed that a certain quantity of iodide of silver will be precipitated; but this is very little. The most of the collodions contain about one and a-half per cent. iodine or bromine salt. Suppose we had iodide of potassium. One part of the same will precipitate one part of nitrate of silver. There are added to 100 cubic centimetres of developer, about 3 cubic centimetres of alcohol, or, as I proposed, old collodion, which will now contain in 3 cubic centimetres about ·045 grammes of iodide of potassium. One hundred cubic centimetres of developer are sufficient for the development of one card-size plate, on which adhere about 5·55 cubic centimetres of silver bath, the usual strength of the latter being being 1 : 10. Thus 5·55 cubic centimetres silver bath contain ·555 grammes of nitrate of silver, which is about twelve times the quantity of the iodide of potassium in the developer. This example shows that there is always ample silver for a sufficient development.

Lately I heard that there is quite a number of English gentlemen who have gone to America in order to make observations of the solar eclipse—Captain Abney, Lockyer, and Roscoe, among the rest. I hope the weather is favourable enough for their observations, and to make a picture of the spectrum of the corona, in which they did not succeed in 1874, on account of bad weather. If anything can be done in this line, Captain Abney is the man to execute it. We owe to him many valuable results in spectrum photography. Recently he has studied my observations about the influence of dyes on bromide of silver. His experiments guided him to results which enabled him to give an explanation for the action of the dyes. A bromide of silver film dyed with eosin is very sensitive for the yellowish-green rays of the spectrum. Captain Abney coloured for his experiments a plain collodion with eosin, and exposed it in the spectrum. The eosin suffered a remarkable change by the yellowish-green rays, which it absorbed. This change was all the more visible when Captain Abney coated the exposed plate with bromide of silver emulsion, and developed it with an alkaline developer (without previous exposure of the emulsion). The bromide of silver became black in all parts where the yellow-green rays had acted upon the eosin. More effectual still was the result with cyanine. Captain Abney now concluded that the dye must have been reduced first by light, and finally acts also, reducing on the bromide of silver, or, better, that the particles of the altered compound may have the property of acting as nuclei, to which the reduced silver compound may be attracted when development is carried out. Thus he explained the action of the dyes. However I may be indebted to Captain Abney's results, I do not think his explanations are altogether right. This experiment is only a success by long exposure. Captain Abney says himself:—"I may remark that the dye in a dyed bromide of silver film is more amenable to the action of light than when experimented with as I did, because the surface of the dye exposed is much greater in the one case than in the other." I absolutely cannot understand why the surface in the one case should be greater than in the other, and I do not think that his explanation can stand the test. I would like to call particular attention to my former observations, which are also stated to be right by Captain Abney: that the dye is non-effective in the presence of an excess of soluble bromide in the bromide of silver film. Captain Abney says:—"The ordinary bromide of silver plate is not developable when an excess of bromide is allowed to remain in the film." In reply to this, I would like to say that the presence of a trifle of soluble bromide (for instance, the quantity of bromide which is generally used for the development of bromide of silver dry plates) is sufficient to render the dye non-effective. I have also proven that those plates regain their sensitiveness for the dye by coating the same with morphin, tannin, or pyro. It follows, therefore, that a dyed and exposed plain collodion, coated with bromide of silver emulsion, containing a slight excess of soluble bromide and pyro, had to show the action of the dye, if Captain Abney's explanations were right; but this does not take place. Only if a dyed bromide film (with an excess of soluble bromide) is exposed together with the dye, is the action visible. I maintain, therefore, my old standpoint. It is a fact that a chemical reaction of certain rays can take place when the same are absorbed by the sensitive substance. Red and yellow rays are but slightly absorbed by bromide of silver, and consequently their action is also slight, though there is an action, which is proven by the fact that I have obtained a picture of the whole spectrum on a pure bromide of silver film by means of long exposure. I infer, therefore, that if the absorbtion of certain rays can be artificially augmented, consequently, also, the chemical reaction of the same are augmented. I added dyes, and found my reflections verified. If one should ask now, what has become of the light absorbed by the dye, I reply that the vibrations of the ether are transported to the molecules of the absorbing substance, which is here the dye. If the velocity of the molecules is great enough, they will split; that is to say, a chemical decomposition takes place. It is known that a chemical decomposition is accelerated in presence of a body which can form a new composition with the resulting parts of the decomposed body. The decomposition is therefore all the more effectual in presence of those bodies which we call in photography "sensitizers." Abney's observations, according to my views, apply only to special cases, a phenomenon of secondary nature which may occur with dyes of great sensitiveness and with long exposures, a phenomenon with which it is impossible to explain the action on dyed bromide of silver by short exposures, and especially in presence of morphine or tannin.—*Philadelphia Photographer.*

PERMANENT PHOTOGRAPHY AND ITS RELATION TO ART AND ARTISTS.

BY W. S. BIRD *

As soon as the development of photographic art had reached the stage of printing from the negative, its applicability to art proper could not be overlooked. The multiplication of copies of drawings, paintings, and sculptures appeared a natural field for cultivation, but excepting in statuary and architecture, the success achieved was not commensurate with expectation. The reproduction of reduced copies of engravings was probably the most commercially successful application, and before the law restrained the adventurous camera, a very profitable field was open in this direction. Of course the rights of artists and engravers were specially protected by enlarging the Copyright Act, but the preliminary freedom tended to develop among the disciples of the "black art" a privateering spirit prone to levy tribute on artistic work, and partially accounting for the ill-favour with which photography is regarded by artists and picture dealers at the present day.

It would be difficult to decide whether photography so far has done so much service to art as art has rendered to it. Its claim to be ranked as one of the fine arts is still disputed, and it is evident that by its mechanical and chemical conditions it is but the holding of a mirror up to nature, in which she reflects herself. Most true is it that nature will reflect herself in much lovelier guise if the camera be directed by the artist's eye, but the added charm is that of selection, dependent on mental character. Cultivated artistic feeling will most certainly exalt the product of the camera. Be it portrait or landscape, grace and beauty will be added by selection, adjustment, and accessory—in a word, by art. But the art is in the man, the photograph in the camera. A heaven-born artist may make a wretched photographer, while perfect technical photography may be utterly deficient in artistic feeling.

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* *Autotype Notes.*

Photography has done good service to art indirectly. It has given unparalleled lessons in perspective, gradation, and realism. It has greatly aided the knowledge of definite form, elucidated the mysteries of light and shade, taught nature's own trick of harmonizing objects at all distances with the general effect, and impressed on the mind the subtle means by which the varied expression of natural beauty may be limned. The marvellous vraisemblance of photography reflects nature as in a mirror complete, save colour, and displays the image in a miracle of light and shade on a plain surface, a vivid lesson that the true artist cannot ignore.

The object of the present paper is principally to consider the adaptation of photography to the reproduction, in a worthy manner, of the special work of the artist's head; to indicate some of the optical and technical difficulties in the way; to enforce special advantages conferred by the Autotype process of printing; and to point out the means by which artists may enlist permanent photography in their service, with more satisfaction than has hitherto been enjoyed.

It cannot be denied that since the reproach of fading has practically been removed from photography the status of the art has been sensibly raised. The British Museum and kindred institutions steadily refused the reception of silver prints, but have adopted both the carbon and the collotype processes for educational purposes. Mr. Braun, of Dornach, purchasing Swan's patent for France, made his mark on all the great galleries of Europe, and has been instrumental in distributing admirable copies of the Old Masters over the civilised world. In fact, it may be said, without boasting, that Autotype has re-enlisted the attention of artists, dealers, and the art-loving public in photography, as a multiplier of art work, and has given additional importance to the camera and its products.

This advance is not merely due to permanency, but partly to the failure of silver printing to attain anything approaching facsimile of the original. However triumphant the rendering of landscape, portraiture, and objects from the solid, the copies of drawings in black and white, or even of engravings, left much to be desired. The photograph of a picture was always a photograph, and nothing more. The copy of an engraving could not easily be mistaken for the original: the high lights were never pure, and from the glaze of the albumenised surface there was no escape. These defects, added to the primary taint of evanescence, justified some of the scorn with which photography, endeavouring to pose as the handmaid of art, has been received in æsthetic circles.

The writer remembers a case where the fading of silver copies of landscape subjects evolved a temporary beauty in the skies that was very captivating. The Art-Union of London commissioned a re-issue in carbon of reduced copies of some seventy engravings that had been published originally in silver. Among these were two pieces where the commencing decomposition of the lines forming the sky had given a peculiar mystical and Turneresque effect. The silver prints in these cases were preferred to the carbon proof until both were compared with the originals, when it was at once seen that the special effect was not there, and that it was, in fact, a chance beauty of decay as transitory as it was accidental. But beauty is not often characteristic of the fading of silver prints; the too well-known sickly yellows and mottled surface do not usually inspire admiration; and the liability to decay has, without doubt, restricted the application of photography to the purpose of art.

* * *

THE ADULTERATION OF WAX.*

Bleached beeswax, which is much employed in photography, either for the preparation of cerate as a varnish for pictures, or for coating glass plates in the transfer process, is, like so many other articles of general consumption, liable to a number of adulterations. Flour, starch, plaster of Paris, China clay, heavy-spar, sulphur, resin, stearin, and tallow, have all been found in adulterated wax, Of these, stearic acid is the most difficult to detect, on account of its resemblance to cerolic acid, which is a constituent of beeswax.

The surest method of detecting the presence of stearic acid is based on the difference of capability of solution of the two bodies in cold alcohol. For this purpose, the wax to be analysed is boiled for about five minutes in twenty parts of alcohol of from eighty to eighty-five per cent., and, after the solution has been left to stand for several minutes, cold water is added to it. If the wax be pure, the solution that floats over the precipitated deposit will remain clear, or be only slightly clouded; but if stearic acid be present, the solution will become turbid with white flocculent particles. Resin can be detected in the same way.

Starch, flour, sulphate of lime, sulphate of barium, &c., may all be discovered by dissolving the wax in ether or in oil of turpentine, as these substances will not dissolve, but remain behind in the form of a heavy deposit. Sulphur can be detected by boiling with solution of potash, and adding a few drops of hydrochloric acid; a perceptible smell of rotten eggs, due to sulphuretted hydrogen, proves the presence of sulphur. A confirmatory test is found by adding a little lead acetate to the solution, which will throw down a precipitate of brownish black lead sulphide.

The admixture of tallow can with tolerable certainty be recognized from the temperature of the melting point.

Pure tallow melts at from 37° to 40° C.

19	parts	tallow to	1	wax	melts at	47°
7	,,	,,	1	,,	,,	49°5
5	,,	,,	1	,,	,,	52°5
3	,,	,,	1	,,	,,	55°5
1	,,	,,	1	,,	,,	59°
1	,,	,,	3	,,	,,	60°5
1	,,	,,	5	,,	,,	61°5
1	,,	,,	7	,,	,,	62°5
1	,,	,,	11	,,	,,	63°
1	,,	,,	19	,,	,,	64°
Pure wax melts at						64°

This method of analysis gives, however, only approximate results, as the mixture of wax and tallow, when the former preponderates, does not give any well-marked differences of temperature. More accurate results can be obtained by observing the amount of glycerine that can be formed from the tallow; as pure wax contains no glycerine, the formation of that substance will at once betray the presence of tallow. This method, however, possesses the drawback of being too difficult for unskilled experimenters; it is practicable only for professional chemists.

When the wax contains a large quantity of tallow it can be at once detected from the soft and greasy nature of the compound, from the fatty fracture, and more especially from the disagreeable smell on its being thrown on live coals; but if the amount of admixture of tallow be less than one-fifth, these tests are no longer reliable.

Japanese vegetable wax, which, on account of its lower price, is often used to adulterate beeswax, can only be detected by means of its melting point; but this substance itself is often brought to market in an adulterated condition, the adulteration being effected, as shown by Dr. Wimmel, a celebrated technical chemist, by the addition of from fifteen to twenty per cent. of water. Beeswax itself is sometimes found containing nearly thirty per cent. of water; when thus adulterated it loses its clear shining appearance, assumes a pale yellow colour, and becomes gritty and brittle. The water can be easily separated by melting. How the adulterators have been able to mix the water with the wax is not explained, as there is no known chemical compound than can effect the combination of the two. These gentlemen seem to have artifices and trade secrets of their own.

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* *Photographisches Wochenblatt.*

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THE LIGHTNING PROCESS.

OUR American friends maintain an interesting amount of excitement in regard to the Boissonas process, introduced to them by M. Lambert as the "lightning process." Some of the most distinguished American photographers are amongst its ardent advocates. In Canada, we find Mr. Notman most enthusiastic in leading the van, and expressing a conviction that it must eventually come into general use. On the other hand, there are some antagonists; probably good men, but certainly unknown men. One who is disappointed sends a stock of the chemicals to the opposing journal—the *Philadelphia Photographer*—for analysis, and Professor Garrett, an analytical chemist, is engaged to analyse the preparations. Here is the report:—

"*Philadelphia, August 20th*, 1878.

"DEAR SIR,—We have examined the three bottles of 'Lightning' photographic chemicals, with the following results.—

"*Collodion.*—Besides ether, alcohol, and guncotton, it contains iodine, cadmium, and a little ammonia.

"*Silver Bath.*—Contains 37·78 grains of metallic silver, or 59·47 grains of nitrate of silver to the fluid ounce.

"*Developer.*—Contains acetic and sulphuric acid, alcohol, protoxide and peroxide of iron, oxide of copper, ammonia, and sugar."—Yours respectfully,

"BOOTH, GARRETT & BLAIR."

The Editor adds:—"From this we may safely say that the collodion is a cadmium-ammonium salted collodion. The bath about sixty grains strong; of fused silver, because it was neutral. The developer is surely a most strange mixture, and in this lies the most novelty."

Should any of our readers who may try the formula fail to get lightning results, we should not recommend them to attribute the blame entirely to M. Boissonas or his process.

More than one English photographer has tried conclusions with M. Klary. The majority to whom we have spoken have fully confirmed the experience we recorded a few months ago. One claims a victory, and states that he, with his especial process, beat Klary on his own ground. We have not heard M. Klary's version of the matter. The alleged conquering formula is given by Professor Stebbing in our Philadelphia contemporary as follows:—

Nitrate of silver	35 grains
Boric acid	4 ,,
Water	1 ounce
Iodide of potassium	*quantum sufficit.*

A few drops of nitric acid, sufficient to render the bath slightly acid.

Developer.

Sulphate of iron	29 grains
Acetic acid	20 drops
Acetate of lead (sugar of fead) ...	3 grains
Water	1 ounce

Put a filter in a clean funnel, and fill it a quarter full with boric acid filter the developer always through it: the solution will take up the necessary quantity of boric acid; the filter and boric acid will last a very long time.

In another case, where it is alleged M. Klary was beaten on his own ground, the formulæ used were very simple and easily tried. They consisted in the use of Mawson's collodion in good condition, a *new* neutral forty-grain silver bath, and a fifteen-grain iron developer!

The difficulty in these cases is to reconcile apparently antagonistic facts. It is difficult to believe that some of the shrewdest, ablest, and most experienced workers in the profession, men like Black of Boston, and Notman of Montreal, for instance—the latter known to many in this country, not only as a very able and experienced photographer, but a keen, shrewd Scotchman, and able man of business—should be deceived by a common-place trick, if M. Boissonas has not placed in their hands something different to and superior to what they have previously worked.

In the meantime, it is not yet offered to English photographers, who have the benefit of the reports of experience from other countries, and plenty of time to experiment and deliberate, before the process is brought before them to purchase or decline.

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THE DANGERS OF CYANIDE.

A MELANCHOLY story reaches us from the beautiful city of Prague, recording the death, under very sad circumstances, of Professor Fischer, a young chemist of high promise attached to the Gymnasium in that city. An ardent experimentalist, he had conceived the idea that the poisonous properties of cyanide of potassium might be neutralized without injuring its efficiency in the industrial arts. Having made the mixture, consisting of the poisonous salt and sal-ammoniac, he tasted the solution, and died before help was available. Any practical value which his experiments might have acquired, unfortunately dies with him, as his papers do not contain the complete record. It is sad to think that the sanguine hopes of the experimentalist had induced him to disregard precaution. For deadly as is the fatal salt, a mere "taste" would not have proved fatal. We have, indeed, foolishly enough, tried a taste, and wondered how anyone, by accident, at least, could proceed further. But in any case a chemist would presumably have at hand an iron solution, which, taken immediately, would prove a remedy. The only moral derivable from the fatal story is CAUTION. The experimental photographer often works with dangerous agencies. Let him be cautious!

The *Observer* of the 15th has a readable leader on the subject, many of the statements of which, we need hardly tell our readers, must be taken with a grain of salt. It says:—

"A most unfortunate accident which has occurred at Prague recalls, in many of its details and circumstances, the quaint traditions that were once prevalent with regard to the mediæval alchemists. Professor Fischer, of the Prague Gymnasium, a young man only twenty-five years of age, and of the highest eminence in his profession—that of chemistry—has come to an untimely end, under the most melancholy circumstances. No one needs to be told that cyanide of potassium, a drug largely used in photography, is a poison of the most deadly character. Its active ingredient is prussic acid. Prussic acid in its pure, or—as chemists would term it—'anhydrous' form, is a substance too dangerous to be kept, or even manufactured. If a glass capsule containing a wineglassful of pure prussic acid were broken in the pit of a theatre those amongst the audience who were nearest the doors might perhaps escape, but the great majority would be killed upon the spot. The prussic acid ordinarily sold, and occasionally used for killing dogs and cats, contains about a drop of the pure acid to a quarter of a pint of water. Pure prussic acid no chemist dare keep. He might as well compress a ton of dynamite into a single cartridge—supposing such package to be possible—and then leave the deadly parcel lying loose upon his table. Cyanide of potassium is not, like prussic acid, volatile. It is a white powder, rather resembling flour or chalk. It is, however, so poisonous that a mere pinch of it, sprinkled over an open wound or sore, will cause almost instantaneous death; that a fragment, almost imperceptible to the eye, will, if swallowed, prove equally fatal; and that its mere smell has before now produced immediate death. It was, it seems, the ambition of Professor Fischer to discover some means of rendering cyanide of potassium harmless. We can do this with gunpowder—although the analogy is not strictly exact, the means employed with gunpowder being mechanical, while those for which Professor Fischer sought were chemical. We know what happens if a light is applied to a keg of gunpowder. If, however, we mix the powder with four or five times its bulk of sawdust, a torch may be held to it with impunity. The mechanical resistance of the sawdust makes it impossible for the explosion to at once spread to the whole mass, and the consequence is that a sort of splutter ensues, like that of a squib or blue light. Professor Fischer's idea was that, if cyanide of potassium were thoroughly mixed with sal-ammoniac, it would be as harmless as gunpowder mixed with sawdust, but would still remain equally available for all those purposes of photography for which it is at present absolutely indispensable.

"In the course of his researches Mr. Fischer made a mixture of which, in his own mind, he felt assured that it would meet the conditions of his problem. He compounded the cyanide with some other substance, and then—turning to his laboratory assistant—said, 'Science has now so far advanced as to be even able to render harmless so dangerous an agent as cyanide of potassium.' With these words he tasted the mixture, and was almost in an instant seized with the most violent and excruciating agonies. He at once implored his assistant to send for medical aid. Cyanogen, however—whether as prussic acid or as cyanide of potassium—kills almost instantaneously. In a few seconds, Professor Fischer was beyond help. We are told that there is no possible reason to suppose that a deliberate suicide had been planned and carried out under the mask of an experiment. On the contrary, there is every reason to believe that the Professor has met the fate which befell only too many of the early chemists and their predecessors, the alchemists. We know, now, what will happen to any experimentalist if he dips blotting-paper in nitric acid, washes it, dries it, and then, incautiously, treads upon it. What happened to the man who is believed—for his records perished with him—to have first discovered fulminate of silver, is matter of scientific record. That he was engaged in researches upon the fulminates, and, more especially, upon the fulminates of the higher metals, was well known. How it precisely came about that he disappeared as he did will always remain matter of conjecture. There came one day a puff, a slight shock, and a smart noise as if some one had inflated a paper bag and then burst it between his hands. Of the Professor himself, of his laboratory, of his apparatus, and of much else within the radius of some yards, not a vestige or trace was left. So it used to be with the alchemists—the heritors of the hidden wisdom of Böhme, and Roger Bacon, and Albertus Magnus. They were always blowing themselves up, or asphyxiating themselves with some noxious vapour. For a man who knows nothing, or next to nothing, of chemistry, it is a very dangerous game indeed to mix together a couple of substances of which he knows nothing, and then bray them in a mortar. Common sulphur is harmless stuff enough, so is charcoal, so is nitre; but let an ignorant man mix the three and apply a light to them, and the result will much astonish him. When, of old, an alchemist was reduced to fragments in this fashion, our ancestors had an easy explanation. He was a magician, they used to say, and the devil had come suddenly, and carried him off. There was a time—between the days of Roger Bacon and those of Davy, Black, and Cavendish, when the foul fiend was thus always carrying off alchemists. We know now how it happened. If a man goes into a chemical laboratory and takes up a big beaker, and pours into it the contents of the first two bottles that are ready to his hand, the probabilities that he will be reduced to atoms on the spot are sufficiently serious to call for his careful consideration.

"Apart from the sad fact that a young man with a bright and indeed brilliant future before him should be thus suddenly cut off, the death of Professor Fischer has another moral. Chemistry—whatever Mr. Lowe may have to say in praise of civil engineering—is the science of the world and of the future. The bridge, which it takes the engineer years upon years to construct, the chemist can, in as many sixtieths of a second, reduce to atoms. Chemistry has given us the balloon: it has put in our hands gunpowder, nitro-glycerine, dynamite, and, above all, fulminate of gold—an explosive so terrible that if an ounce of it be left in a stoppered bottle, its grains, falling amongst themselves by their own weight, will create a convulsion sufficient to lay all London in ruins. It has given us poisons so subtle that—were we to resolve to employ such means of warfare—we could sale in a balloon over the camp of the enemy and drop upon it a shell, the bursting of which would kill every human being a mile within its range. Then, too, chemistry has given us disinfectants. To the chemist we owe carbolic acid, chloride of lime, and permanganate of potash. Chemists have taught us to disinfect our sewers and drains, to ventilate our houses, to burn gas instead of oil, and to light our streets with what is more powerful than even gas itself—the electric light. It is to chemistry, indeed, that we owe almost all the comforts of everyday life. But, on the other hand, the possibilities of chemistry are almost too terrible to be contemplated. As the science at present stands, any student can, if he have access to a well-stored laboratory, carry away with him in a pill-box matter sufficient to lay London in ruins, or to poison the whole community of its inhabitants. The chemist can—as every schoolboy knowns—convert water into ice in the centre of a red-hot crucible. He can construct a shell the size of a cricket ball which will explode the moment it touches the water, and overwhelm in flames a hostile fleet. Indeed, the chemist reduces the world to its original and primal elements. For him, even more than for the engineer, nothing is impossible. And yet his power—vast as it is—is limited. He can more easily destroy than construct. He can take life, but he cannot give it. He can level a city with the plain, but he cannot build it again. He can create prussic acid, but he is ignorant of its antidote. He is like the fisherman who rashly opened the vessel sealed with the ring of Suleiman Ben' Daoud. The forces at his control are beyond his command; the powers he can evoke he cannot lay. It is the old story of Cornelius Agrippa—those who trifle with Nature's secrets do so at their peril.

THE SOCIETY OF ARTS AND PHOTOGRAPHY.

We give the following details, from the Programme of Examinations for 1879, issued by the Society of Arts, of qualifications for certificates and honours in connection with photography bestowed by the Society.

The examinations are specially intended for the benefit of members of Institutions in union with the Society of Arts; and though other persons are admitted on certain conditions specified, they cannot compete for prizes,

Photographers generally, however, will, no doubt, be interested in noting the qualifications requisite in their art as judged by the Society.

PART I.—GENERAL SCIENCE.

1. *The Elementary Certificate.*—For this Certificate the candidate will be required to have passed in the elementary stage of the following subjects:—Subject 10. Inorganic Chemistry. 2nd Grade Art (Freehand Drawing). He may then count marks in any of the other subjects given in paragraph 4.

2. *The Advanced Certificate*—For this Certificate the candidate will be required to have obtained at least a First-class in the elementary stage of Subject 10—Inorganic Chemistry. Also a 2nd Grade Art (Freehand Drawing and Perspective), and to have passed in the elementary stage of Subject 8—Acoustics, Light, and Heat. He may then count marks in any of the other subjects given in paragraph 4.

3. *Honours.*—For Honours the candidate must have at least passed in the advanced stage of the science subjects given in paragraph 2, with a 2nd Grade Art (Freehand and Model Drawing and Perspective). He may then count marks in any of the other subjects mentioned in paragraph 4.

4. The following branches of science are more or less involved in the practice of Photography, and may be studied with advantage:—Subject 1—Practical, Plane, and Solid Geometry; 8—Acoustics, Light, and Heat; 10—Inorganic Chemistry; 11—Organic Chemistry. The student may also with advantage take up Practical Geometry, Freehand and Model Drawing (2nd Grade Art).

The following prizes are offered by the Society to such candidates only as obtain first-class certificates. We may remark that the Photographic Society of Great Britain contributes £7 towards the prizes in photography:—

To the best candidate in Honours, £10.
To the best candidate in the Advanced Grade, £7.
To the best candidate in the Elementary Grade, £5

A candidate cannot take a prize of the same grade more than once, and, having taken a prize of any grade, he cannot take one of a lower grade in a subsequent year.

PHOTOGRAPHY IN THE PARIS EXHIBITION.

THE display of photography in the great International Exhibition now open in Paris is less interesting and less important than in any previous exhibition of the kind. If it had been larger and better, it would have been difficult to form any comparative estimate of the work of different countries, as the photographs, instead of being arranged in one gallery, are scattered over every part of the enormous building, in the departments belonging to the different nationalities exhibiting. There is absolutely nothing new or impressive in any department we have seen. France exhibits excellent work, but nothing novel. There is nothing like the startling excellence which took English visitors by surprise in the works of Adam-Salomon exhibited in 1867. The master does not exhibit this year. English photographers will learn with deep regret that a sad domestic bereavement in the early part of the year quite prostrated our estimable friend. The partner of his joys and sorrows and artistic triumphs was taken from him, and his heart was too much bowed with grief to permit him to take interest in preparing contributions for the Exhibition.

In the English department we have very fine work; but the display is far below the average of the annual exhibitions in the Society's rooms in Pall Mall. We understand that the medals are awarded; but we have not yet seen a trustworthy complete list. Four gold medals are taken by English contributors. The two English opticians, Ross and Dallmeyer, get gold medals; and a gold medal is awarded to Mr. H. P. Robinson, and another to Mr. Vernon Heath. Silver and bronze are freely awarded to other contributors. A detailed list shall appear in due time.

A NEW PORTABLE CAMERA.

MR. ROUCH has recently patented a new portable camera, which possesses many points of advantage in portability and lightness, without any sacrifice of efficiency. The primary novelty consists in the accommodating character of the tail-board, which does double duty. The camera should be seen to be duly appreciated, but a description may afford some idea of its construction and working.

"When packed up, the ground glass is protected by a hinged wooden cover which folds over it; this cover, when moved upon its hinges, turns right round under the camera, and forms the base-board, which can by the action of a screw be clamped either at a right angle to the ground glass, or at any desired angle, forming in this respect a most efficacious means for swinging the back so as to allow of tilting the camera, securing in landscapes the most perfect sharpness of the foreground, and in architecture absolute freedom from the distortion of the vertical marginal lines of a building. Convergence of perpendiculars will thus be entirely avoided.

"To provide for the extension and focussing of the camera, there is a movable central framework, which can be attached without screws to the base-board in a few seconds, the nature of the attachment being such as to confer the utmost rigidity. This carries a single and centrally situated rack-and-pinion, which secures a range of focus so great as to enable the widest angle-lens, equally with those of very long focus, to be employed. Screws and loose parts are avoided in this instrument, and everything is so strongly made as to preclude the possibility of its getting out of order.

"Special provision is made for taking such subjects as churches on the vertical direction of the plate; this is done with as much facility as the obtaining of a landscape in the horizontal direction. The camera-front slides in a double direction, so as to admit of raising the lens either when a vertical or a horizontal picture is being taken."

It is singularly light and portable when packed, and not less rigid and efficient when in use. There are no loose screws or parts to lose, a point of no little advantage.

PHOTOGRAPHS OF THE UNKNOWN DEAD.

THERE are, perhaps, few purposes to which photography is applied in which it better administers to the alleviation of human sorrow than when, by preserving records of the unknown dead for identification, it sets at rest terrible doubts and anxieties as to the missing. We have received from Mr. Louis Gumprecht some photographs of the unclaimed victims of the recent river catastrophe. Mr. Gumprecht has performed his ghastly task with great skill, the photographs not being inferior to the majority of those produced in a studio with every facility for successful management of light and shade. Years of experience in producing such aids to identification for the police have given skill in pursuing the work, and familiarity will, we hope, have robbed the task of some of its inevitable horrors. The redeeming feature, making the task less uncomfortable than might seem, is probably found in the circumstance, suggested by the portraits before us, that the expression is generally calm and happy, and not suggestive of the horrible struggle for life which such a death implies.

The *Observer* has some interesting remarks on the subject:—

"Photography has found many applications of late, and the practical use made of it by the police is not the least important. In connection with the appalling catastrophe on the Thames, the camera did much to assist in the identification of the bodies, and there are still photographic records in the hands of the police which, together with the particulars of clothing found upon the drowned, will doubtless lead in the end to clear up all doubts in connection with this lamentable affair. The London police now make it a rule to secure a photograph of all bodies found, and copies are sent to stations all over the country, where people having missing friends may see the pictures. In Paris, the assistance that photography may lend in judicial matters is recognized even more fully, and there is a photographic staff at the *Rue de Jerusalem*, presided over by two skilled operators, who enjoy the rank of inspectors of police. In Berlin, again, especially since the attacks on the Emperor, the chief of the police, Herr von Madai, has made great use of photography in the registry of criminals. Herr von Madai has suggested that there should be international records of criminals kept by the aid of photography, and, in order to start the project, has furnished the European capitals with an album containing portraits of all the chief delinquents in Prussia. In this country, as our readers are aware, we also make it a practice to photograph all criminals; the county goals send up to Scotland Yard copies of their photographs, while governors make an exchange of collections among themselves. As it is, the portraits of our own malefactors make up a vast series, and, if criminal photography is to become an international industry, we shall want a special library to contain the results. In the meantime, there can be little doubt that the system of keeping portraits of prisoners in this way must exert a salutary check upon crime."

FRENCH CORRESPONDENCE.

The Awards at the International Exhibition—Improvements in the Heliochromic Process—Photography as an Auxiliary to Painting—Bromized Gelatine.

The Awards at the Paris Exhibition.—The great question now agitating the minds of all around us, and foremost among all others, is the decisions of the judges in the award of prizes at the International Exhibition. Although no authorised list of awards has been officially published, appeals and complaints are pouring in from all sides. The exhibitors who believe they have been slighted overwhelm both the managers of the Exhibition as well as the members of the Jury with letters describing their wrongs in the most vivid terms; and some of them, not content with this, have not hesitated to make their sorrows public by enlisting for them the hospitality of the press. As far as we ourselves are concerned, we can assure our readers that scarcely a day passes without bringing us a larger number of protests against the decisions of the International Jury, with a request, amounting almost to a demand, that they may be published in the *Moniteur de la Photographie*. Now, however natural may be the desire of every one to see his works and efforts properly appreciated, we cannot forbear to remark that, to say the least, too much haste is shown in crying out against cases of injustice and partiality which exist, no doubt, only in the imagination of the complainants; or which, at all events, can only have become known through the indiscretion of officials, and can, therefore, enjoy but a very limited confidence. We prefer to believe that the jurors have executed the difficult task entrusted to them with great care and complete impartiality, and that at the close, when the awards are officially made known (though it may, of course, be impossible to satisfy every exhibitor), it will be found that there is no case of manifest injustice. We feel sure that the merits of each have been examined, considered, and rewarded in a spirit far from one of clique or party, and that zealous workers and indefatigable investigators will not have cause to regret that they have taken part in the grand international competition. For the ceremony of the distribution of the awards the date of the 21st of October has been finally and definitely adopted; it will take place on that day at the Palais de l'Industrie in the Champs Elysées. Until then no official list of prize-holders will be published. Notwithstanding the most urgent entreaties, the Council of Ministers and M. Krantz have not allowed this decision to be altered. Let us hope that the weather may then be propitious, and that in this respect the Exhibition may close under better auspices than it opened.

M. Ducos du Hauron's Heliochromic Process.—I have lately received from M. Ducos du Hauron a letter in which he gives some interesting details of improvements that he has recently been able to introduce into the process that he calls heliochromie. Our able investigator is more and more satisfied with the use of eosine as a colouring material for collodion (compare the description of this method that I have already given in my previous correspondence). It will be remembered that the great inconvenience that was formerly attached to the process invented by M. Ducos du Hauron arose from the length of time required for the exposure of the three negatives on glass by the combination of which he is able to obtain coloured impressions on emulsified papers. Since the opening of the Exhibition, however, he has succeeded, after many experiments, in considerably shortening the time of exposure. He has been able to reduce the whole duration of the three exposures of the three negatives to a single minute in the shade, and he expects that this space of time may be still further diminished by using the energetic developers which have lately been recommended. At present, with landscape objective closely diaphragmed, he is able, in less than a minute, to obtain in the sun the triple negative of a landscape which, with the unimproved process that he adopted some months ago, would have required at least nine or ten minutes. To the letter of M. Ducos du Hauron that brought me this information there were appended two specimens of his recent work that greatly surpass anything that we have seen before, even in the International Exhibition. These are reproductions reduced from two paintings in oil of the eighteenth century, and he has succeeded so admirably with them, that they might easily be taken for the original works of masters of that age. We are able, therefore, to record a great and very striking progress in the practice of this interesting process, and acquit ourselves of the task with the greatest pleasure.

Photography in Aid of Portrait Painting.—The Count de Courten, who is just now much engaged in painting, and who attaches himself more particularly to the portrait branch of the art, has lately sent us a letter in which he asserts that photography is of very great assistance to him in his work, and more especially in that part of it where the resemblance and artistic pose of the subject are affected. There is nothing to astonish us in this, for our art has from the first been of the greatest use and assistance both to the painter and the sculptor; but our obliging correspondent is good enough to describe to us the system that he adopts to adapt to his own purpose the facilities placed at his disposal by the photographic art, and to furnish us with details of his method of working, which, as it seems to us, our readers can put to advantageous use. Having taken with a quarter-plate apparatus a well-sunk, but not too vigorous (as that would be injurious), negative, he places it in an enlarging apparatus not exceeding in size that of the half-plate, and obtains from it a positive on glass by means of wet collodion; this transparent positive is then fixed in a sort of frame or camera mounted on a stand which can be raised or lowered at pleasure; a lens of large surface is used to enlarge the image, and a white metal reflector on hinges completes the apparatus. The apparatus for enlarging is in itself simple enough; it consists merely of the above-mentioned quarter-plate camera, which is turned round, and to the objective of which is attached a truncated cone of cardboard, and a frame to support the half plate dark slide. The whole apparatus is placed on a table in the shade, and pointed towards the sky. The exposure must be of extremely short duration. Very clean positives are obtained in this way. It seems superfluous to add that any part of the model can be enlarged according to wish.

M. Boivin's Views on Bromo-Gelatine.—I cannot resist the desire to reproduce in this place the opinion of bromo-gelatine expressed by my fellow-worker, M. Boivin (who has exhaustively studied the different dry processes), in the introduction to an important work on this subject, of which he has just sent me the first sheets. Bromo gelatine, he says, can be very easily used; it is convenient to manipulate, does not decompose, and in keeping it there is nothing to fear provided it be protected from the light and from damp. Sensitized plates are prepared in this process with the greatest ease, and keep for any length of time. A little bromo-gelatine is dissolved in warm water, and poured on the plate; this constitutes the whole of the operation, and nothing can be more simple. The duration of exposure varies from that of an instantaneous one to one of some seconds. In this process it is not necessary to use a substratum on the plate, nor an organic preservative on the sensitive film. The image can be developed completely and promptly, even when a long time elapses between the exposure and the development. I am bound to add that, in support of his opinions, M Boivin has sent me some specimens of very great beauty and notably a country landscape taken in the height of summer, with an exposure of a few seconds, in which the details are reproduced with the greatest delicacy. For the rest, several other photographers have already expressed an analogous opinion on this process, which begins to count numerous admirers in France. Ernest Lacan.

ON THE BUSINESS QUESTION.

BY NELSON K. CHERRILL.

It is, to my mind, a very curious circumstance that photographers do not adopt some universal system, to be carried out in all studios, in the matter of the business arrangements between themselves and the public.

In all other trades and professions definite rules seem to have been adopted, and the public obey them with unquestioning regularity. In our case, as no two studios follow the same rules, the public seem to have a general notion that, in dealing with photographers, all order, regularity, and, even in many cases, honesty, may be entirely dispensed with.

I have read with great interest the article in the Year-Book, by Mr. Jabez Hughes, on the payment question. I cannot quite agree with all Mr. Hughes says on the subject; for instance, I don't think any man should acquire wisdom simply for the sake of making money by it—that is, it seems to me the lowest, basest, and most unworthy object for which a man can live. "What is the use of getting wisdom, unless as a means to more effectually getting money?" So asks Mr. Hughes. What is the use of getting money, unless as a means to more effectually getting wisdom? I would rather ask. Let this pass, however.

I have spent a great deal of time in *thinking out* the various problems that are presented to the photographer by the legitimate wants of his customers, and I am convinced that the invariable "cash at the time of sitting" is not the *best* for the general rule. I know that very many think differently upon this point, but as I have fully satisfied myself of the advantages of the system I have adopted, I will state the whole matter in detail for the benefit of those of your readers who may like to adopt some such plan themselves.

Before, however, I go into the details of the thing, I should like to mention what I consider the advantages and disadvantages of the two main systems—cash and credit.

The greatest advantage in the credit system is, I think, that, by keeping accounts open, they get added to, little by little, and so a certain amount of waiting pays well for itself. If an order is not made definite till after the proofs have been sent home, it is often a larger one than would have been the case had the number been fixed at the first. There is also a certain danger that when an order is paid for at the time, the customer considers the matter a "done transaction," and is, so to speak, "free" to go and try some other place; whereas with "an account," people seem to think themselves more or less bound to go on where they have begun.

But for all this, the "cash at the time of sitting" would be a splendid institution if all photographers would join in making the rule absolute. This, however, will never be the case so long as men like Mr. Hughes say that the "credit system must be adopted when dealing with 'local magnates' or 'well-known customers.'" This is the difficulty, and in my experience this is the weakness of the whole matter, for "local magnates" are likely to be the plague of one's existence, and "well-known customers" are often too well known for the length of credit their patronage demands I think a man who knows himself to be honest and solvent has a right to be offended if a tradesman refuses to extend to him the credit which others can obtain. To give an illustration. Plain Mr.—— may justly feel indignant at being made to pay his fifteen shillings or a guinea at the time of sitting, when he knows as a fact that the Hon. Sir George Charles Augustus, K.C B., &c., &c., &c., has owed the same photographer twenty pounds any time the last five years, and that the said photographer would, at a moment's notice, go and stand out in the street, without his hat, in a drenching rain, and talk in the sweetest and blandest manner possible (as if he were quite enjoying himself) at the carriage window of the said Hon. Sir George Charles Augustus, K.C.B., &c., &c., &c., to take an order for a couple of duplicate cartes, which he knows all the time won't be paid for for years and years.

What is the remedy for all this, and for all the difficulties which a photographer gets into with his customers in the matter of payment? This is a question of interest and importance, and, as I said at the outset, I have spent much time in working it out, with a result greatly to my own satisfaction. I will express the system arrived at—briefly.

I divide my customers into two main sets or classes; the one I call "cheap lines," and the other "proof lines." The "cheap lines" are all worked on the cash system; no proofs are given to select from, but care is of course taken that the photo. shall be *good* from a technical point of view. Against these portraits I admit of no appeal. A customer may say he would like something altered; the answer is, "We will do another dozen, making the alteration you wish, but charging you the same amount again; you will then have two dozen photos., one dozen of which you will *quite like*, and the other dozen (which you now have) are very good, but there is just a little something you would like altered, and for the two dozen in all, you will have paid only a trifle more than if you had had proofs in the first instance to select from." I always find this answers, because though people *say* they want this or that different, all they generally mean is, that they want another trial, to see if they can get something they like better.

This may not seem to have any connection with the cash business with which I commenced, but it has; for I find that "local magnate and old customer" section referred to by Mr. Hughes all come quite naturally under the "proof lines," which, as I have already intimated, are very much more expensive; as in the price charged for them I have to consider the time and trouble and waste occasioned by taking and finishing up two or three quite useless negatives, and also the loss of time occasioned by delay in getting the "order" as well as the possibility of a *resit.* If any of these people want "cheap lines," they can have them, but the law is of the Medes and Persians, that changeth not, that cheap lines are "not booked." This system, with a scale of charges skilfully arranged, I find to work admirably, and, in my hands, it softens down the various difficulties presented by the credit-loving British public.

INSTANTANEOUS PHOTOGRAPHY.

BY E. LETELLIER,

Director of the Societe des Archives.[*]

In reply to the enquiries of many of our readers, we give the following instructions for the composition and preparation of the collodion and the silver and iron baths that we use in taking instantaneous photographs of marine views, and of objects in motion.

Extra-rapid Collodion.

No. 1.—Pyroxyline	5·50	grams
Sulphuric ether rectified to 65	285	c.c.
Alcohol rectified to 43°[†] ...	115	„

Let the pyroxyline soak in the sulphuric ether, and then add the alcohol. The pyroxyline should dissolve completely.

No. 2.—Alcohol	50	c.c.
Cadmium iodide	3	grams
Ammonium iodide	2·50	„
Potassium iodide	·50	„

Pulverise the salts, and dissolve them in the alcohol.

No. 3.—Alcohol	50	c.c.
Cadmium bromide	·85	grams
Ammonium bromide... ...	·75	„
Potassium bromide	·12	„

Treat in the same way as No. 2. Add these three solutions together, stir several times, and let it stand for some days.

Silver Bath.

Distilled water	600	c.c.
Pure silver nitrate	100	grams

The silver nitrate must have been fused at a low temperature. Dissolve it in the alcohol, and filter; then add a few centimetres of the above collodion, shake well, and filter again.

Extra-rapid Iron Bath.

No. 1.—Distilled water	600	c.c.
Iron sulphate	50	grams

Place the salt in a filter, pour the water over it, and filter several times.

No. 2.—Alcohol of 40°	25	c.c.
Glacial acetic acid	15	grams

Dissolve the acid in the alcohol. Then mix No. 2 with No. 1.

Remarks.

Veiling will take place in proportion as the silver bath is heavier, or as the collodion is more strongly iodized, or as the iron bath is more concentrated. It is necessary, therefore, that the silver bath should absorb a sufficient quantity of silver iodide, and to effect this a few c.c. of collodion are added as directed above.

I find that a mixture of a new silver bath with one of eight per cent., which has been in use for ordinary purposes, answers equally well, on condition, however, that the latter be not exhausted, and that the collodion is made with the same iodides as the former. A new bath should be heavy enough to restore the whole at ten per cent.

According to several authorities, a new silver bath should be slightly acid, and a few scales of iodine should be added to the collodion. For my own part, I do not find it necessary to have recourse to these means. My experience is, that a neutral bath, prepared as above indicated, will not fog, and works more rapidly, while the extra-rapid collodion is and remains in good order without the addition of iodine.

I recommend that the plate be moved about briskly in the silver bath, in order to prevent any streakiness of the film, which has a great tendency to repel liquid. It is indispensable to work in full daylight, and with fine weather.

Very quick objectives must be used, and they must be fitted with diaphragms as may be necessary. An instantaneous shutter is necessary, as it often happens that an exposure of one-sixtieth of a second is sufficient, and under such circumstances covering and uncovering the lens by hand would be quite impossible; with such an apparatus, also, the negative is much more delicate.

The same process may be employed for portrait photography in the studio. With an extra-rapid objective for a half-plate, and a good light, the exposure need not be more than from one to two seconds. When the dimensions are larger, it is necessary for the collodion to be a little thinner, that it may run over the plate more easily.

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[*] *Revue Photographique.*

[†] Alcohol of 40° contains much too much water for producing instantaneous effects.

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PHOTO-ENAMELS IN THE PARIS EXHIBITION

In the "Autotype Notes" issued by the Autotype Company Mr. Sawyer gives some interesting details of his impressions in visiting the photographic department of the International Exhibition. On the photographic enamels he says:—

"In enamels, England is far behind. It is absolutely worth while for any one giving attention to this special branch to go over, if for nothing else than to see the splendid photographic enamels in the French department. Monsieur Walery, of the Rue de Londres, exhibits some splendid ones of very large size, 14 or 15 inches high, one being a portrait of Victor Hugo, and the colour is so fine, a rich purply black, none of that sour unsatisfactory tone so prevalent among ordinary enamels. The Comte de Roydeville exhibits a frame of excellent work all in enamels, portraits, copies of paintings, landscapes, &c., in three colours, pure black, a red similar to red chalk, and a photographic colour; also enamels on Faience.

"Monsieur Deroche also strikes our attention: his enamels are not so large as some of those named, but for colour and brilliancy they surpass them. Here we noticed a portrait of the Prince of Wales, with a portrait of Victor Hugo on one side and our friend Robert Faulkner on the other, all three being lovely examples, good in colour, the half-tones most perfectly retained, whilst the brilliancy of general effect was remarkable."

It is to be regretted that the best English enamellers did not send. Mr. Robinson, Mr. Mayland, and others who do very fine work, for some reason abstained from sending anything.

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Proceedings of Societies.

Manchester Photographic Society.

The ordinary meetings of this Society were resumed on Thursday, the 12th instant, Mr. **Alfred Brothers**, F.R.A.S., occupying the chair.

The minutes of the last meeting were read and passed.

The **President** said that the proposed exhibition had been abandoned, in consequence of the small number of exhibits promised.

Mr. D. **Young** exhibited a lantern carrier, and read a description of it (in our next).

Mr. W. J. **Chadwick** disputed Mr. Young's claim of originality in the carrier before the meeting. Mr. Chadwick exhibited his back-pressure valve for preventing explosions in lantern practice, and showed some negatives on Swan's plates, all sufficiently dense. One of the negatives represented Mr. Chadwick holding a wax vesta, by the light of which it was taken.

Mr. **Coote** had again fallen into trouble with his plates, and exhibited some of large size quite spoiled by curious markings.

Mr. **Pearson** showed some negatives taken on board a steamer.

The **Secretary** laid the *Bulletin* of the Belgian Photographic Society on the table.

The members then adjourned to the lantern room, where Mr W. J. Chadwick, with Mr. McCall as spokesman, exhibited a large number of views of Paris, &c., kindly lent by Mr. York for the occasion.

The meeting, which was very largely attended for September, passed the usual complimentary votes, and was then adjourned.

Talk in the Studio.

The Royal Visit to Brantinghamthorpe.—Messrs. Turner and Drinkwater, photographers, of Elm-tree House, Anlaby Road, Hull, by special request, attended at Brantinghamthorpe last week, and took several large groups, as well as single portraits, of the Royal party, and these have been done with so much success as to meet with the high commendation of the whole of the visitors.

Photographing the Mirage.—Upon this subject, respecting which some remarks appeared in our issue of the 6th inst., the *Daily News* of the 17th writes as follows:—"The American invention which is to tell underwriters the whereabouts of ships in which they are interested is certainly as wonderful as anything Swift wrote about. It is to answer, we are told, at any distance from one hundred to five thousand miles, so that practically the whole expanse of the Pacific and Atlantic Oceans may henceforth be kept under strict supervision. The invention, too, is simplicity itself. Ships in mid-ocean are at some fixed period in the day—say four p.m.—to emit a cloud of smoke by the aid of petroleum and asphalte, which is burnt in a censer proper to the purpose. This cloud goes up aloft and hangs over the ship, and its functions are to act as a mirror or reflecting surface, so that the phenomenon known as the mirage may be artificially produced. Not only is the whole of the vessel reflected in this mirage, but also some monster figures that have previously been chalked upon the deck by the sailors. These figures indicate the number of the ship and the latitude and longitude in which it is lying. What so easy, then, supposing these figures to be reflected in a big cloud over the vessel, as to photograph them from a distance? Observing stations provided with suitable cameras will be on the look-out, and as the clouds dot the horizon in various directions they will be photographed. An enlargement of the photograph in each instance will supply the valuable information, and this will be telegraphed to the owners or the nearest *Lloyd's* agent. The inventor of this marvellous plan is said to be a practical mechanician of New York, one Mr. Gresham; and so sanguine is Mr. Gresham about the value of it that he believes the time will come when all insurance companies will recognise it, and 'insist that all vessels shall carry the necessary apparatus.' There is always a breadth about American notions, and the present idea is not wanting in that respect, for it is one of the widest applications that has yet been made of photography. Of course, if Mr. Gresham can get insurance companies to 'insist' that all vessels shall carry his apparatus, Mr. Gresham will soon become a rich man. Otherwise, we fear, he may have a difficulty in getting captains to use what he terms the phantasmograph."

Primary Colours.—M. Chevreul, in a paper in *Comptes Rendus*, comes forward in support of the optical principles of Newton, and in opposition to the hypothesis recently advanced that the fundamental colours are red, green, and violet; yellow being formed of red and green, and blue of violet and purple. The author's experiments sufficiently proved to him that the late views put forward with much apparent authority are absolutely false.

Effects of Lightning as Shown by Photography.—A paragraph in *Nature*, of which we give an abstract, affords some interesting details of the action of lightning on trees, as revealed by photography:—"A Geneva correspondent sends us a photograph showing the effects of lightning on an aspen situated in a wood near the Chateau of Crans on the shore of the Lake of Geneva. The lightning chooses by preference the poplar as a conductor to reach the ground, and the case is striking here, where the tree is surrounded by other kinds, particularly firs, taller than it. Two great branches, of forty-five and fifty centimetres in diameter, which surmounted it, were struck by the lightning, and led it to the ground without having received the least apparent injury, while the trunk below them is absolutely shattered. This is a fresh proof that the upper part of trees, especially of poplars, is an excellent conductor of electricity, which only rends or shatters the wood when it finds a passage in the trunk. Other recent observations prove the preference of lightning for trees situated near streams or reservoirs of water, so that the best conductor for a house is a lofty tree, a poplar especially, situated between the house and a well, a pond, or a neighbouring stream."

To Correspondents.

Gumbo.—You will be able to buy apparatus and chemicals generally better and cheaper in this country than in New Zealand. See an article in our pages on photography in New Zealand, July 27, 1877; also in December 1, 1876.

R. C. R.—The best instructions for working the alkaline negative bath are those given by Mr. Frank Eliot, the originator of the process. You will find the articles in the Year-Books for 1875, 1876, and 1878. The principle is to make the bath alkaline by means of carbonate of silver, and use a collodion containing a trace of free iodine. 2. One of the most sensitive dry processes is the coffee process as described in our Year-Book for 1877, p. 145.

S. Thomas.—We have used with advantage two grains of pyrogallic acid, with one drachm of acetic acid and one grain of citric acid, in an ounce of water. An iron developer containing ten grains of protosulphate of iron and twenty minims of acetic acid in an ounce of water will answer, but not so well as the pyro.

Marsh Brothers.—The last day for sending pictures to the exhibition is Saturday, the 28th.

B. R. G.—You will see, on a moment's reflection, that we cannot recommend makers by name in our columns. To your second question we may say unhesitatingly, that the high class English opticians hold the highest place in the world as manufacturers of photographic lenses. You may by chance pick up a good French lens often enough; but you cannot buy with the same certainty of obtaining the highest excellence.

Young Amateur.—The following is, we think, the recipe to which your friend refers. It is excellent for cleaning the hands when stained with nitrate of silver, or other chemicals, without any danger:—Put ½ lb. glauber salts, ¼ lb. chloride of lime (the sanitary disinfectant), and 8 oz. of water into a small wide-mouthed bottle, and when required for use pour some of the thick sediment into a saucer, and rub it well over the hands with pumice-stone or a nail brush, and it will clean the fingers quite equal to cyanide, but without any danger. This will do to use over again until exhausted, and should be kept corked up. A correspondent says: -The objection to the use of this mixture for cleaning the hands is that it leaves such a disagreeable smell. This may be entirely avoided by the liberal use of lemon juice, which not only removes the smell, but whitens the hands. Rotten ones may be used, and answer well.

G. W. R.—The term magic photographs has been applied to various kinds of sun-pictures. Sir John Herschel originated those to which you probably refer. The method of producing them is as follows:—Pictures are deeply printed on ordinary albumenized or salted paper, washed, and, without being toned or fixed, put into a saturated solution of bichloride of mercury. In twenty minutes or half an hour the pictures will totally disappear, when they are thoroughly washed and hung up to dry. White filtering-paper, of the ordinary thickness, impregnated with a saturated solution of hyposulphite of soda, and dried, serves as a developer: on placing the filtering paper in contact with the invisible picture, and dipping them into water, the magic photograph appears. The colour may be modified by the agent used in making the image visible. For the hyposulphite, chloride of gold or a sulphide may be employed.

R. M.—If the paper be damp when placed on the negative, it is not unusual for a brown stain to be produced on the negative; a tuft of cotton wool dipped into a dilute solution of cyanide will remove such stains, clean water being applied immediately after to remove all traces of cyanide. Of course we are assuming that the negative is well varnished.

A. Borland.—Will Mr. Borland favour us with his address? We have a letter from America for him.

Edwin H. Lincoln.—Both the books for which you inquire are published, but the edition of the one that has been advertised for a year past will probably be exhausted ere your order could reach the publishers. Another edition will, we understand, be issued.

P. H. Davies.—Our correspondent will find the ferrous oxalate developer given in the News for April 26th last. It is made as follows:—Dissolve six ounces of neutral oxalate of potash in a pint of hot water to make a saturated solution. To this add six drachms of ferrous oxalate. When it has dissolved as much as it will, filter. It may be used in a dipping bath. It requires about a quarter of an hour to develop a dry emulsion plate.

J. J. E.—You can buy better varnishes than you can make. But the following will answer well for ferrotypes. Take thirty grains of gum dammar, and dissolve in an ounce of good benzole. For a collodion take equal parts of ether and alcohol, dissolve in it pyroxyline at the rate of four or five grains per ounce. Add iodide of cadmium, two grains; iodide of ammonium, two grains; bromide of cadmium, one grain. Use after it has been one week mixed. It will keep good six months.

Several Correspondents in our next.

The Photographic News, September 27, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

AN EXPERIMENT WITH EXPLOSIVE GELATINE—COLLODION, GELATINE, AND ALBUMEN—HOW TO PHOTOGRAPH TORPEDO EXPLOSIONS.

An Experiment with Explosive Gelatine.—We have recently been experimenting, but with small success, with a novel film for photographic purposes, produced by dissolving the new detonating mixture—explosive gelatine—in alcohol and ether. The compound in question, though gelatinous to look at, is not gelatine at all. It is a mixture of nitro-glycerine and gun-cotton, in the proportion of ninety-three parts of the former to seven of the latter. It dissolves readily in a mixture of the solvents mentioned, and appeared at the outset to promise very well as a vehicle for the sensitive salts employed in photography. The solution flowed evenly over the plate, and did not set so rapidly as collodion; it appeared, in fact, admirably suited to instances where a long exposure was necessary; but it must, we fear, be placed in the same category as chloride of silk, or silk dissolved in hydrochloric acid, which many photographic experimenters have tried with little avail. The explosive gelatine solution, however, dries better than silk—this, by the way, is deliquescent, and does not dry, under ordinary circumstances, at all—but still the film remains without any absolute firmness, a serious drawback to its employment as a photographic film. The solution, indeed, formed a deposit rather than a skin. On the addition of iodizing salts, the solution at once set free some of the iodine, and assumed the aspect of ripe collodion; to judge from its rich, oily appearance, one could not but feel sanguine of its photographic properties. Two exposures were, however, sufficient to show that the new material was useless in the studio. Two images were produced in each case: one upon the surface, that could readily be removed by rubbing; and the other, a very faint one, in the film itself. The latter was probably due to the small amount of pyroxyline which the solution contained. The development, such as it was, was very rapid, influenced, no doubt, by the amount of glycerine in the solution, but there was no perceptible advantage that would tempt further investigation; indeed, subsequent results proved that the photographer will be quite as well without having to do with "explosive gelatine." It is terribly poisonous, and the effect of merely rubbing the finger over a film of the solution which contained but two per cent. of the material was sufficient to produce a violent headache and sickness for many hours afterwards. Although at the time there was nothing to lead one to believe in its injurious nature, the feeling of the film proved sufficient to bring on a violent attack of nausea, which did not pass off entirely for twenty-four hours. And this happened not only to ourselves, but to another experimentalist who was working with the material at the same time. It is more, indeed, for the sake of pointing out this deleterious quality of nitro-glycerine, and especially of a solution of its compound in ether and alcohol, that we are led to record these negative results, than for any other purpose.

Collodion, Gelatine, and Albumen.—The impossibility of employing a solution of explosive gelatine in photography, any more than a solution of silk, impresses one more than ever with the singular fact that the great photographic triumvirate—collodion, gelatine, and albumen—are still alone and unassailable. These three substances photographers made their own long since, and not another substance has since been added. We make use of collodion both in the negative and positive process, in the latter case under the form of collodio-chloride, or collodion transfers. Gelatine has long since been used in carbon and collotype printing, and is now to the fore in negative work in the form of a bromide emulsion. Albumen, again, was used as a vehicle for the sensitive salts upon glass plates before collodion was thought of, and is still much used in dry plate preparations, while at the same time it takes a prominent place in silver printing. We can employ collodion, gelatine, or albumen pretty well one for the other, use one only, or all three of them in our photographic processes, but we cannot do without them, neither can we, apparently, add to their number. A new sensitive plate is invented, or a new printing process, but one or other of these materials play a part in them. We add acids or alkalies, bromides or iodides, modify or change, do what we will, we still make use of these three valuable substances, and no other can be found to replace them.

How to Photograph Torpedo Explosions.—In the case of some torpedo explosions recently photographed in America, Mr. Sothen, who directed the operations, tells us that the same electric current which fired the charges also opened the camera. Exposures then rapidly followed one another at intervals of half a second. We are quite unaware how far Mr. Sothen succeeded, but from former experience of torpedo explosions we should hardly think that the first exposure of all would reveal anything, especially as it lasted only for but a sixteenth or twentieth of a second. While the explosion of a charge by electricity is practically instantaneous, the upheaval of water, or result of the explosion, happens some time afterwards. In this country, several gentlemen have given the subject attention, and have produced good results, but they have never, to our knowledge, made use of electrical communication for giving exposures. Mr. Baden Pritchard, of Woolwich (who made the arrangements for photographing the early torpedo experiments against the *America* hulk), Captain Abney, and Mr. Francis Elwell, of Weston-super-Mare, who have done a considerable amount of similar work, all preferred to trust to the hand of the operator rather than have recourse to electricity. In fact, any one who has watched a submarine explosion from land must have felt surprised at the lengthy interval between the firing of the charge and the full effect of the result. Although the torpedo may be half a mile off in the bed of the channel, the spectator is immediately warned of the explosion by the shock through his feet, and then, as it were, the water rises slowly, remains, as it were, suspended in mid air for an instant, and then falls again. If a photographer desires to choose the right moment, he has only one thing to bear in mind as he holds the button of the shutter in hand, and that is, not to be too hasty. His hand will work quite fast enough when it comes to the exposure, and it is quite a mistake to suppose that you cannot act fast enough. In the case of Mr. Sothen at New York, he had an automaton apparatus, seemingly, which would give him a series of views, and therefore he has probably been able to secure pictures of the operation throughout which must be exceedingly valuable and interesting; but we can hardly think the first exposure would show him anything. We shall be glad to know if this is so; but our readers need be under no apprehension that electric communication with the camera is actually necessary to secure good results of torpedo explosions. If they should ever have such work to do, our advice is simply not to be in a hurry to get it over.

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PHYSICS IN PHOTOGRAPHY.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

THE emulsions, if made exactly as already described, might or might not give a film which, after exposure to the image formed in the camera, would develop without blackening all over under the action of the developer; or, in photographic parlance, might or might not develop without fog. If the soluble bromide be in excess in the emulsion, and be then washed out as described, the sensitive films would be free from this evil, whereas if the silver nitrate were in excess, this would not be the case. The cause of this difference in behaviour has lately been explained, though the means of correcting the emulsion has long been known. The reasoning will perhaps be rendered more clear if the experimental proofs be recounted in the order in which they were made. We must suppose that we have at hand a perfect emulsion, a film of which will give a bright image on development, after exposure in the camera. Let half-a-dozen plates be prepared with such an emulsion by simply flowing it over glass plates, and allowing the films to dry; and then let these be exposed in the camera for the time necessary to give a strong image on development. Let the plates be immersed respectively after exposure in a weak solution of nitric acid, of potassium permanganate, potassium bichromate, nitrous acid, hydroxyl, iodine or bromine vapour, or be exposed to the action of ozone, it will be found that the image impressed by light will steadily refuse to develop, however much it may be coaxed; or again, if another half-dozen plates be prepared and be exposed to light external to the camera, we know if exposed to the lenticular image after such treatment, that we might obtain an image on development, but that it would be obliterated by the veil induced by the preliminary exposure. If between the preliminary exposure and exposure in the camera the plates be treated with any of the above solutions or vapours, and be then washed, we should find the impressions of light in the camera would yield images perfectly free from the veil. In other words, the treatment of the film with any of these solutions will destroy the effect of the action of light. Now, as we have already shown, the image is formed of silver sub-bromide; hence we may say that the treatment has changed the sub-bromide to an undevelopable compound. When exposed to iodine or bromine the sub-salt will naturally become converted into the primitive salt; but when we look at the nature of the other destructives, we cannot but be struck with the fact that they are either solvents of metallic silver or oxidising agents. In the first case we may presume that the loose atom of the silver of the sub-bromide (Ag_2Br) is dissolved away and converted into some other form of silver, leaving behind the half molecule of bromide, and in the other we may presume that the sub-bromide is oxidised to form an oxybromide of silver.

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* *Nature.* Continued from page 447 P.N.

With this fact as a starting point, it appeared probable that the elimination of a veil due to an emulsion ought to be effected by the same agents as if the veil occurred through the action of light. It was well known that in order to get an emulsion perfectly free from this enemy that chlorine, bromine, iodine, or some diad chloride or bromide were necessary to be added to the washed emulsion if the silver nitrate were in excess at first, and that nitric acid had the same effect if added to the emulsion with the silver nitrate. Here, then, seemed to be the proof of what was wanted, but another link was still required to make the reasoning complete. In making an emulsion, if the soluble bromide was in excess, none of these agencies were required. The question then arose as to why this was the case. To clear this up a fair hypothesis was taken, viz., that no soluble bromide was absolutely free from contamination. If the bromide were of the alkalis or some of the metals such as zinc, it was probably contaminated with the oxide, whilst with other diad metals it was probably of the lower form of bromide. Thus cupric bromide was probably contaminated with cuprous, and cobaltic with the cobaltous, though in infinitesimally small quantities. Now the former impurity would cause the formation of silver oxide, and the latter of silver sub-bromide (argentous bromide). Experiment showed that the former would act as a nucleus on which the metallic silver, reduced by development, would be deposited, whilst the latter would have the same composition as the latent image, and thus induce the objectionable veil. The same reasoning applied to the chlorides, but the whole explanation was still incomplete. Experiment showed, however, that the order of formation of the different compounds of silver was as follows. Argentic bromide formed first, next argentic chloride, then argentous bromide and chloride, and finally the oxide. If, then, there was but little of the impurity present in the soluble bromide used in forming the emulsion, pure silver bromide would alone be formed, leaving the impurity in solution and in a state to be washed out. The whole subject of the fog-giving properties of emulsion was thus cleared up, and the correction necessary for it was apparent.

All practical photographers are aware that in the ordinary dry plate processes there is a deterioration of the image if plates be kept a long time before exposure and development, and if sufficiently long time elapse that the image will almost refuse to develop at all. The question arises why this obliteration of a developable photographic image takes place? We have seen how an image can be destroyed artificially by the use of oxidizing agents, and we might naturally infer that the same destructive agency might obliterate the image even when the oxidizing agent is merely ordinary air, and after considerable experimental proof we are compelled to come to the conclusion that this is the case, more especially when it is found that any readily oxidisible matter, such as gallic acid, if applied in solution and dried in contact with the sensitive film, preserves the image for a longer period than if this precaution be omitted. The oxidisable matter has to be oxidised before the image itself is attacked, for we may assume that the image itself is not as readily oxidisable as such bodies as that mentioned and many others. The fact that the image can be oxidised and thus destroyed, seems to disprove the once held opinion that the undeveloped image was formed of metallic silver, a body which will tarnish but not oxidise, the pure oxides being unstable.

As a sequence to the destruction of the photographic image by oxidation, the hitherto unexplained results which Draper obtained when photographing the spectrum were examined. Briefly it may be stated he found that if a spectrum was allowed to fall on a sensitised Daguerreotype plate, which had received a preliminary exposure to white light, a remarkable phenomenon took place—a phenomenon which was also observable if weak white light were allowed to fall on the plate during its exposure to the solar spectrum. In developing such an image with mercury vapour, the blue, or most refrangible end of the spectrum, was impressed in the usual way—that is to say, the Fraunhofer lines showed as dark lines on a lighter background; at the red or least refrangible end of the spectrum, however, the Fraunhofer lines were seen as light on a darker background; in other words, the photographic action was reversed, the neutral point of no action lying somewhere in the yellow. On studying a picture taken by this means, it was observed that in all cases the darkest Fraunhofer lines had the same tint, and that effect of light lines upon dark backgrounds, or dark lines upon the light background, were caused by alteration in tint of the background itself. Could this effect have anything to do with the oxidation? If it had it would indicate that the rays in the least refrangible end of the spectrum must *accelerate oxidation;* for it must be remembered that the plates had received an exposure to white light either before or during exposure to the spectrum, and that the red rays prevented the development of the effect of the white light.

Now Draper had failed to get the same results on films of collodion containing the sensitive silver compounds, though he had obtained the reversal of the least refrangible end of the spectrum on such plates. If the theory of oxidation held good for Daguerreotype plates, it ought also to hold good for the collodion films, and experiment decided once again in favour of the theory. Collodion films, which held *in situ* the blue form of silver bromide already alluded to, and which had been proved to be sensitive to the red end of the spectrum in the ordinary sense of the word (*i.e.*, that a proper negative picture of it could be obtained as it could of the blue end), were the subjects of experiment. It is evident, if the red rays were accelerators of oxidation, that in order to get a positive picture of the red end (*i.e.*, one answering to the reversal of the Fraunhofer lines in Draper's Daguerreotype plates) the films should be exposed to the spectrum whilst in some oxidising medium, weak enough by itself, not totally to obliterate during the time of exposure to the spectrum any preliminary exposure which should be given to them, and yet strong enough to do so and to destroy the reducing action of the red rays, if these latter possessed a power of accelerating oxidation. Ozone, hydroxyl, nitric acid, and other oxidising agents, completely corroborated the idea that all the red rays had the power of accelerating oxidation, as the positive pictures of the red end here obtained, and in some cases of the blue end, with negative pictures of the yellow and ultra-violet. The strength of the oxidising solutions was very small; thus, when nitric acid was used, four drops to a couple of ounces of water was found sufficient to cause this remarkable action to take place, whilst if the nitic acid were reduced in quantity, or omitted altogether, the effect of the ordinary negative picture was obtained in that part of the spectrum (Figs. 3 and 4). On the other hand, when the strength was increased, the image disappeared altogether. Figs. 3 and 4 show the results indicated above; the shaded portions show where the spectrum was photographed in the usual way, the white portions indicate where the reversed action took place.

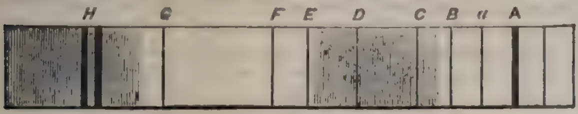

Fig. 3.

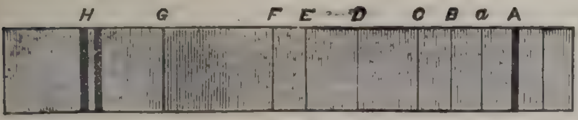

Fig. 4.

We are not sure, but we believe that Draper used silver iodide as his sensitive salt in the experiments with collodion, in which he failed to obtain these phenomena. The iodide is insensitive to the red end of the spectrum under ordinary conditions of exposure, being usually exposed in the presence of a solution of silver nitrate which clings to it after taking it out of the bath. It was found, however, if this free silver nitrate were washed away, and if the exposure to the spectrum took place in the oxidising medium, after a preliminary exposure to white light, that this reversing action, as it is called, of the red end of the spectrum was obtained; and under certain conditions, if the silver nitrate were removed, that the same results could be obtained even when the plate was not exposed in this oxidising medium.

Now regarding the reversal in the blue indicated above, how can it be accounted for? By the very same theory, only an abandonment of the hypothesis that the least refrangible end of the spectrum *alone* is an accelerator of oxidation becomes necessary. In all comparative experiments made with the Daguerreotype plate and the collodion film the difference of these conditions must be remembered. In the former the halogen liberated by the action of the light on the iodide combines immediately with the metallic plate, forming fresh sensitive compound; in the latter the thickness of the sensitive compound has a limit, and much of it is altogether inoperative, the outside of the particles alone being available for the reducing action of light, and the halogen has to escape or be absorbed as best it may. In a collodion film it is manifest that the reduction of all the sensitive compound available must take place after a time, and when this is the case, if the same rays which effect reduction likewise accelerate oxidation, that the latter effect of the rays will have unimpeded action. So much for the theory: does experiment prove or disprove it? It is evident, if the hypothesis be correct, that a film which is exposed to the action of light in a medium free from oxygen, or in one which is an absorbent of oxygen, should be incapable, on development, of showing this reversal of the ordinary action of light.

The results again showed that the theory was borne out, for it was found impossible to obtain a reversal of the image when so exposed. Here, then, we have a probable explanation of the phenomenon known as solarisation, to which allusion has already been made; it seems to be an oxidation of the undeveloped image.

(*To be continued.*)

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SHUTTING OUT DIRECT SUNLIGHT.

A correspondent of our Philadelphia contemporary says:—

"Having curtained my skylight for the summer campaign by a new method that works so nicely, I must recommend it to all who are troubled with direct sunlight in the operating-room, which all operators know to be so annoying and disastrous to 'fine effects' at certain hours of the day.

"First, remove your regular curtains (they probably need washing or renewing by this time, anyhow); paste white tissue-paper along each sash of the skylight, and let it hang downward; use the regular size sheets, pasting them along one edge only. This shuts out direct sunlight effectually, and gives a very strong diffused light, pleasant both to the sitter and to the temper of the operator. In cloudy weather very little light is obstructed, as it passes straight downward between the rows of hanging tissue-paper. Make a light frame of 2 by 4 scantling, a little larger than the skylight, and suspend it about a foot below the tissue paper, and hang your muslin or other curtains to this framework in the same way they were originally attached to the skylight.

"By using these curtains in connection with the tissue paper, you have perfect control of the light in all kinds of weather. You will be surprised at the fresh, cool, shady appearance of your operating room, and also at the cheapness of the whole affair. When the dark fall days approach, the tissue paper can be easily removed; but let your regular curtains remain on the movable framework, the lower part of which should rest on two blocks nailed to the wall at the lower part of the skylight. The upper part of the frame can be hoisted at any desired height by two small ropes attached to the corners, running through large screw-eyes in the casing of the highest part of the skylight, and can be lowered in five minutes whenever you wish to repair or remove curtains for washing, which, if done occasionally, adds very much to the appearance, and shortens the time of exposure."

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THE MODERATOR ELECTRIC LIGHT.*

In a recent article upon the subject of electric lighting we indicated the progress that had been made of late years in the practical application of electricity to the purposes of illumination. Briefly stated, the position of that branch of applied science at the present moment may be said to consist in the use of this source of illuminating power in lighthouses and in a comparatively few other special cases. In practice, the light generated by a magneto-electric machine is utilized through the agency of carbon points held in what is generally known as the "Serrin" lamp, thus named after its inventor. M. Serrin, by means of this lamp, has rendered practicable electric lighting and signalling, and his lamps, or others constructed on precesely similar principles, continue to afford the only means of carrying out electric lighting in practice, with some slight exceptions to which we shall presently refer.

But the Serrin lamp and others of its class have their defects, which have long been recognized and sought to be remedied. The lamp is actuated by a train of complex clockwork, by means of which it is intended that the carbons shall be kept a certain and definite distance apart, which is necessary in order to obtain continuity of light. The constant shortening of the carbon points by combustion has to be compensated for and followed up by the agency of mechanism. If the carbons approached too closely, or if they were allowed, by reason of their consumption, to separate too widely, an extinction of the light would ensue. Now, mechanism of a delicate and complex nature, such as is a train of clockwork, is always objectionable. Moreover, in lamps of the Serrin type, when the carbons have been consumed, there must be a total extinction of the light—temporary only though it be, yet still an extinction—while they are replaced by fresh ones. But the most serious objection is that with the Serrin lamp not more than one light can be obtained from one electric machine. However greatly the power of the machine may be increased, the intensity of that single light only is increased: it cannot be divided by adding a second lamp. Besides this, the Serrin lamp is specially designed for illuminating with the continuous current of the Gramme machine, with which it is now generally used. To adapt it for use with a machine producing alternating currents its internal mechanism would have to be altered. Again, if, when connecting up the wires with the lamp, the positive wire is by accident attached to the negative side, the point of light will rapidly descend. These, broadly, are the defects which exist in the system of electric lighting as at present generally practised.

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* *The Times.*

Apart, however, from objections in details, there is one grave defect in the general principle of electric lighting which has hitherto proved an insuperable barrier to its adoption in streets and public buildings, with one or two experimental exceptions. This defect is the difficulty—we might almost say the impossibility—of subdividing the electric circuit so as to produce a series of lights from one main source, just as, to put it in a familiar way, a number of gas burners are served from one meter and through one main pipe. The single light produced is an intensely powerful and brilliant one, and its range of penetration extends over many miles; therefore, other things being equal, for lighthouses and signalling purposes nothing could be better. When, however, we come to apply it to the purposes of public street lighting or to the illumination of buildings, we have an objectionable concentration of light which is dazzling to the eye and which produces intensely dark shadows. It is true that by means of reflectors, toned glass shades, and other arrangements, a more diffused and softened light is obtained, but inasmuch as this means the destruction or waste of a portion of the light produced, it is evidently not an economical method of using it. Moreover, the mechanical defects to which we have referred still remain, besides which the principle is only applicable under certain restricted conditions, for it is not possible to illuminate a large space from a single point in a satisfactory manner. The subdivision of the light is a *sine qua non.*

This subdivision of the electric current has long been the cherished dream of many who have addressed themselves to the subject, and hitherto it has proved but a dream. Of all those who have endeavoured to solve the problem, four only, as far as we are aware, have hitherto come prominently before the public with even approximate results, and, singularly enough, they were all Russians. Still more singular is it, perhaps, that a fifth *savant* of the same nationality has recently attempted its solution, and, so far as present experience has shown, has been eminently successful in effecting his object, as we shall presently explain. The first to attempt the subdivision of the electric current was M. Lodyghin, of St. Petersburg, who some years since electrically burnt fine carbon rods *in vacuo* out of contact with the oxygen of the atmosphere. The result, however, was failure, owing to the circumstance that by subdividing the light, M. Lodyghin greatly decreased its illuminating power. Later on—namely, in 1874—MM. Kosloff and Konn, both of St. Petersburg, worked out M. Lodyghin's idea with improved details and with considerable success as far as experiment went, as reported by us at the time. We are not, however, aware that the invention ever proceeded beyond this phase.

Still more recently—only last year, in fact,—another Russian gentleman, M. Paul Jablochkoff, demonstrated the practicability of subdividing the electric current. This he does by employing what he calls an electric candle, which governs the electric light and supersedes the clockwork lamp. This candle consists of two pencils of carbon connected together side by side, and at the same time insulated by a strip of kaolin. The light is generated by a magneto-electric machine, producing alternating currents of positive and negative electricity. In this way M. Jablochkoff succeeded in lighting up, first, his own workshops, then the Marengo-Hall in the Magasins du Louvre, Paris, and afterwards a portion of the East and West India Docks, as reported by us at the time. The system is one of considerable promise, and is still in use experimentally in Paris. But, like those by which it has been preceded, it has its practical defects, although they are not of quite so serious a nature as those to which the others were subject. Among these drawbacks is the break in the continuity of the light which necessarily occurs when the consumed carbons have to be replaced by new ones. It is true that M. Jablochkoff has a very neat switch arrangement by which the consumed carbons are removed and replaced very rapidly. But there is a limit to the length of the carbons, as well as to the number the holder will carry. Besides this, if the light is extinguished—and this occasionally did occur during the experiments in London—it can only be reinstated by connecting the two carbons of the candle together with a needle of the same substance. Moreover, if one of the electric candles in a circuit is accidentally extinguished, the whole series in the same circuit suffer extinction. Again, for supplying the source of light, this system requires a special machine producing alternating currents, the ordinary machines with continuous currents being useless here as generators of light. But the most serious defect in the Jablochkoff candle is that the insulating substance which is placed between the two carbons—the kaolin, in fact—robs them of a very large percentage of their illuminating power. This can only be accounted for by the fact that the insulating material, when heated, really becomes a conductor of electricity, abstracting a portion of the current from the points, and thus greatly reducing their effective illuminating power.

(*To be continued.*)

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WORKING HINTS FROM PRACTICAL MEN.

OUR Philadelphia contemporary some time ago invited hints, as to their modes of working, from the practical men amongst his readers, and received various responses. We cull a few hints from the various communications published by our contemporary.

Keeping Bath Warm in Winter.—Mr. W. G. C. Kimball says:—"A method adapted in my gallery for keeping silver baths for negatives at a summer temperature during the winter may be of service to photographers. A large box is made, with a soap-stone bottom, into which the bath-holders are placed, being allowed to stand at the proper angle by wooden pieces nailed on inside, and the top of the baths protruding about an inch above the top cover of box, and fitting closely to keep the heat enclosed, and consequently even, over the whole surface of the bath. Each bottle is protected from light and dust by covers tipping back on hinges, and a gas jet under the soap-stone bottom of the box makes the thing complete. Another labour-saving arrangement is to keep silver bath for paper in silvering dish, simply covering with sufficient care to keep out dust, &c. The evaporation in in the flat dish will nearly keep up strength of solution, and saves much waste incurred in pouring back into bottle."

Preparing an Iron Developer.—Mr. E. S. Wertz says:—"Perhaps the best thing I have to offer is the way I prepare my iron solution and developer, which is as follows:—

Protosulph. of iron	16 ounces
Iron and ammonia	8 ,,
Sulphate of copper ...	1 oz., or 480 grs. (Troy)

Place each of the above salts in a separate bottle; add just enough pure water to make saturated solutions (if anything, allow just a little free salt), then allow to settle for a few days; then decant all the solutions into one bottle, and mix. The three make your stock solution always ready and convenient for mixing just as much developer as you may want for the day's work, or the time being, or just to suit the kind of work in hand. I use, for white drapery, one fluid ounce stock solution, six drachms acetic acid No. 8, and ten fluid ounces water. For general use, one ounce stock, one ounce acetic acid to eight ounces pure water, which makes about a twenty-grain developer. With a bottle, stock solution, acetic acid, and pure water, at hand, you have perfect control of your developer, as to strength, &c., and oftentimes secure a negative that, under ordinary circumstances, would be lost."

Solar Prints from Coarse Negatives.—Mr. C. A. Zimmer says:—"When printing from a coarse, hard negative—one that is badly varnished, perhaps—and a good clean and soft print is desirable, or a print from any solar negative is wanted that will need no spotting, proceed as follows:—Print about half done, then lay over the unfinished print a piece of ground-glass, same size of the print and always with the ground side towards the condenser, and continue printing. This will have a softening effect, without affecting the sharpness; ordinary blemishes disappear as if by magic, and a good print is made possible by this means from negatives that would ordinarily yield bad results."

Care Needed in Fusing Silver.—Mr. J. H. Henning says:—"In placing the following before your readers, I am confident that many of them have learned to appreciate the advantages of boiling down the negative bath, and fusing the silver. As regards the total destruction of the organic matter and free salts from the collodion, the driving off of all alcohol, ether, and acid, this is certainly the most reliable mode of rectification. Now, when about to proceed in this direction, we find that numerous articles have been written on the subject, and the general mode of accomplishing the best results is given, such as diluting the bath by adding the same to about one-fourth its quantity of water, thereby causing the precipitation of the iodide, which is to be filtered out; then boiling down to dryness, and fusing the mass until it again liquefies, when it should be set aside to cool gradually. The foregoing is at once simple, and anyone may thereby rid himself of the troubles attendant with a disordered bath; but I find that one important point has been omitted, and I would, therefore, call attention to the following. Having made up two large baths about a year ago, the one, after prolonged use and frequent additions of nitric acid, as a remedy in case of fog from organic matter, &c., I was at last compelled to put under treatment for fusing, from over-iodization. You are fully aware that the mass of fused silver is generally of a dark brown or black colour, and during the operation of dissolving the mass, and making up the bath anew, all this precipitated matter is filtered out. This was also the case in my proceedings: a sufficient amount of water was added, then filtered and set out in the sun, where it remained three months, when it was brought in for service, and upon trial I found plate after plate literally covered with fog, and cause unknown, except indications of over-iodizing. Finally, under the impression that organic matter might have gained access to the bath through some cause to me unknown, I again diluted the quantity, and found it to be over-iodized. Now, after the act of again fusing, the mass was this time perfectly white, and the solution remained perfectly clear, until I had added about twenty ounces of water, when it immediately turned milky, and continued gaining in intensity, so that by the time the balance, one hundred and forty ounces of water, had been added, it had attained quite a creamy appearance, thus establishing the fact that the bath was greatly over-iodized, said iodide having been held in suspense in the solution by the presence of the great quantity of acid, which, upon evaporation, left the excess of iodide undissolved, and caused the heavy fog and pinholes. I now again added the bath, for the third time, to one-quarter its bulk of water, filtered, and boiled down to original strength, and without a day's sunning; all worked charmingly, and no trouble has been experienced since."

A Good Collodion.—Mr. F. M. Spencer believes his collodion to be very excellent, and gives details as follows:—"I give herewith a method of preparing collodion which I believe to be fully as sensitive as any collodions of the so-called lightning processes, and possessing indefinite keeping qualities. I disclaim any share of originality for the process or formula, but do not know to whom to give credit, but suppose it to be of German origin.

Alcohol	8 ounces
Ether	8 ,,
Iodide of potassium	32 grains
Iodide of cadmium	40 ,,
Bromide of cadmium	28 ,,
Soluble cotton	about 80 ,,

"Now, please follow strictly the following method in compounding:—The bottles used should be carefully cleaned. Weigh out the salts in the order given in the formula, then proceed as follows:—In a clean glass mortar grind the thirty-two grains of iodide of potassium to fine powder; then add the twenty-eight grains of bromide of cadmium, and continue the grinding until the salts become fluid; then add the forty grains of iodide of cadmium, and grind to a paste. Now measure out eight ounces of pure alcohol, and pour off five ounces into the bottle, and add a small portion of the remaining three ounces to the salts in the mortar, and grind away until the alcohol is quite saturated; then allow the mortar to rest until all the undissolved salts have settled to the bottom, when the five ounces of alcohol in the bottle should be set rapidly whirling, and the clear portion in the mortar decanted into the bottle, being careful to lose none of the undissolved salts; then add another portion of the reserve three ounces of alcohol to the mortar, and proceed as before, repeating the operation until all the salts have been dissolved and added to the alcohol in the bottle, rinsing the mortar with the last portion of the reserved three ounces of alcohol. Now add the eight ounces of ether, ounce by ounce at a time, to the solution in the bottle, being always careful to set the fluid in the bottle whirling rapidly while the addition of ether is being made, and during the intervals of at least a minute between each addition of an ounce of ether at a time, until the whole eight additions have been made; then the solution may be allowed to stand a few hours, when it should be closely filtered through prepared cotton into another perfectly clean bottle, when the cotton may be added in proportions of about five grains of the cotton to the ounce of excited solution. Any good brand of soluble cotton may be used. This collodion may be filtered and used at once, or, what is better, be allowed to stand until all insoluble particles have subsided, and then decant as wanted. I do not recollect ever seeing a sample of this collodion spoil by age; indeed, I have not been able to keep it until it passed its prime; with me it improves by age. But be that as it may, one great merit of the formula is that, omitting the cotton, any quantity may be prepared at a time, and kept for years even; so that by preparing a large stock at once, all further trouble may be avoided, except to add the cotton to measured portions as desired for use.

(*To be continued*).

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CYANIDE AS A POISON.

It is tolerably certain that cyanide of potassium is much less commonly used amongst photographers than it used to be. The repeated cases of injury from absorption through the skin; the frequent cases of accidental poisoning; and the reiterated warnings of the press, have aided to banish this poisonous salt from many operating rooms. Still, it is occasionally used by some photographers who have (most of them) some general idea that it is a deadly poison, but very slight knowledge of its nature, properties, and antidotes. A notion prevails amongst many, who are not generally misinformed, that it is inevitably fatal—that there is no remedy. A general statement of this fact may be regarded as true, because the action of the poison is so rapid that there is rarely opportunity for the administration of antidotes. The writer of an interesting article in the *Observer*, which we quoted in our last, suggested that an emetic was the only available remedy. Doubtless, as a general rule, the first and most valuable step should be to relieve the stomach of the presence of the poison by means of vomiting or the stomach pump; but, unfortunately, in the case of cyanide, and indeed all cases of hydrocyanic acid poisoning, this is the least available remedy. The first symptoms produced, and these almost immediately, are the clenching of the teeth and closing of the throat from tetanic spasms. If there be time to administer anything, it should be something which will neutralize or destroy the hydrocyanic acid, and this, happily, is generally available, and in a photographic operating room readily accessible. It simply consists in a draught of the ordinary iron developer, by which the cyanide is converted into prussian blue, a harmless salt without toxic properties.

There are not many cases of recovery from hydrocyanic acid poisoning on record; but there are some. Dr. Alfred Swayne Taylor, whose work is the best accepted text-book on forensic medicine, records a case in which the patient had swallowed by mistake a dose of prussic acid equal to six grains of cyanide. Perceiving his error at once, he immediately took an ounce of aromatic spirits of ammonia (*sal volatile*) with water, and, as soon as it could be prepared, a solution of sulphate of iron was taken. By perseverance in this treatment, and cold affusion, the patient recovered.

As we have said, the ordinary iron developer, which had better have a little ammonia or carbonate of soda added to neutralize acid, may be taken at once with advantage, because it is generally ready mixed; but a simple sulphate solution is not absolutely the best form of iron salt for neutralizing the prussic acid, by combining with it to form the harmless blue salt. This is an operation with which almost every photographer is familar, when he has applied cyanide without having thoroughly washed away the iron developer, blue stains resulting.

To secure the decomposition and recombination in question precisely, four equivalents of a per-salt of iron and three of a proto-salt are necessary. A precise remedy may be prepared as follows:—Take of liquor perchloride of iron, thirty-seven minims; pure crystallized protosulphate of iron, twenty-five grains; and dissolve in half-an-ounce of water. This quantity will decompose and neutralize thirty-five grains of cyanide of potassium. If the remedy were intended for a case of poisoning by prussic acid pure and simple, not combined with an alkali, it would be desirable to add carbonate of soda to the iron salts, four scruples being dissolved in half-an-ounce of water, and added to the iron preparation.

If the iron preparation be administered at once, the prussic acid, being thus attacked, enters into a new combination at once, and loses its fatal power. Suitable stimulants, such as sal-volatile, help to check the shock to the system, and cold affusion applied to the spine aids in recovering the patient. These appliances, it should be said, are for immediate application, because promptness in applying antidotes is of the first importance in all cases of poisoning; but a medical man should always be called in at once, as he in most cases will have to deal with incidental symptoms arising from idiosyncrasy, even if the poison be perfectly neutralized. The marvel that occurs to our own mind in relation to the case of the young professor at Prague is, that as at best he was engaged in experiment in an unknown and dangerous field of investigation, he had not prepared himself with a well known remedy for immediate application in case of any mischance occurring during his perilous research.

A sceptical correspondent writes us a letter for publication, in which he attempts some feeble fun at the expense of the article we quoted from the *Observer* in our last. We may say, in the first place, that under any circumstances the subject is scarcely a legitimate one for fun; and in the next, our correspondent is generally in error in making his points. It is very probable indeed that the story of the death of Professor Fischer may be exaggerated, as the bare statement of such a fact without explanatory details often is. It may even be a *canard* altogether; but we see no reason to suppose it to be a "sensational paragraph concocted in a court in Fleet Street or the Strand." Our correspondent makes merry with the idea of the destruction of a pitful of playgoers, being poisoned by the fumes of a bottle of pure prussic acid, and wishes to know how the makers of the deadly drug escaped destruction. The answer is very simple: with manufacture of prussic acid, as of many other deadly drugs, special ventilation arrangements to carry the fumes away from the operator are imperatively necessary. And in manufacturing this dangerous and volatile acid the attendant well knows his risk, and retires at once if he by chance breathe the malefic vapour, of which he is warned by being plunged into darkness by its paralyzing effect on his eye-sight. It is not necessary to discuss our correspondent's remarks on the fulminates, beyond recommending not to experiment with them.

Once more, we strongly recommend photographers to banish cyanide, if not from the operating room altogether, at least to its most remote and inaccessible corner. And further, we recommend them equally as strongly to obtain some knowledge of the poisonous chemicals they use, and of the remedies possible and most accessible in case of accident by any of them.

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SUBTERRANEAN PHOTOGRAPHY BY ARTIFICIAL LIGHT.

We have recently received some very interesting examples of subterranean photography by Mr. Wm. Brooks, of Reigate. They consist of the interiors of some natural caverns which are utilized for the storage of wines, &c. The colour of the surface is black and blackish green, which increased the difficulty of the task. Where the electric light, the lime light, or the magnesium light can be employed, the actinic quality of the light is sufficient to render the task of photographing dark interiors scarcely difficult; but the mechanical troubles of introducing such light are not easily overcome, and are, in many cases, insuperable. Mr. Brooks has, in the present instance, with a happy audacity, dispensed with the aid of such actinic lights, and used common paraffine lamps duly distributed, and has avoided the difficulty of keeping wet plates moist by using dry gelatine emulsion plates. The plates are very sensitive, and Mr. Brooks has a special method of development, which practically augments the sensitiveness still further, by bringing out the feeblest impressions. The exposures required varied from one hour to five hours with Dallmeyer's compound stereoscopic lens of three and a-half inches focus.

There is no evidence in the pictures of the limited nature of the light; everything is duly rendered and fairly modelled, all trace of the intense shadows generally noticeable where artificial light is employed being absent. In view of the recent terrible colliery accident, the possibility of lighting mines by means of the electric light, or other light out of the control of the miner, has been discussed. The method of disposing his lamps employed by Mr. Brooks would be manifestly available for lighting a mine by means of a source of light duly fixed and protected, without need of individual lamps with which the miner can tamper whenever he wishes to light his pipe. Mr. Brooks' subterranean photographs open out a new possibility in this direction, and are interesting in every sense.

FRENCH CORRESPONDENCE.

More about Gelatino-Bromide—Improvements in Photometers.

The Gelatino-Bromide Process.—Within the last few days I have received still further testimony, and that of the highest character, in favour of the gelatino-bromide process. A Spanish amateur of great experience, M. Arenas, of Barcelona, who is just now in Paris, has informed me not only that he shares the expectations of those who look forward with the greatest confidence to the future of this method, but also that he intends from henceforth to adopt it in his own work to the exclusion of all others. I should add that with an enthusiasm for photography quite his own, he has made himself familiar from the very commencement with all the dry processes that have from time to time been published; he is therefore able to speak *ex cathedra* when he maintains the superiority of the process in question. M. Arenas asserts that the preparation of dry emulsion of gelatino-bromide is perfectly easy, and that all the other operations possess a delightful simplicity, a characteristic which is very precious in photography. To re-dissolve the dry emulsion, when the glass plates are to be coated, it is quite sufficient, according to his own experience, to use common water, a point which is of great importance, especially to landscape photographers. The sensitive film adheres to the plate so closely that in developing or washing neither creases nor lacerations are produced. Plates that have been sensitized can be preserved in perfectly good condition for any length of time, provided that they are kept in a suitable atmosphere and temperature. As regards rapidity of exposure, it is such as to satisfy the wants of all. With a quarter-plate objective closely diaphragmed, on plates that have been prepared for some months, and that are developed a very long time after they have been exposed, M. Arenas takes views in which the green colour predominates in five seconds; the same subjects taken on wet collodion would require from eight to ten seconds' exposure. I am further assured by M. Arénas that pictures taken on gelatino-bromide are so hard and solid that they do not require to be varnished; however, relying on the pertinence of the operation in the carbon process, he proposes to pass the negative through a solution of alum, so as to render them perfectly unassailable.

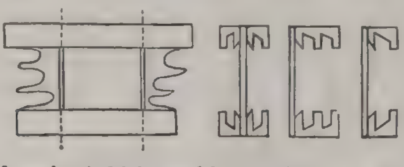
Improvements in Photo-meters.—In the third edition of his *Traite pratique de Photographie au Charbon*, which was published at the end of last year, M. Leon Vidal has described an opportune addition that he has made to his photometer. I allude to his graduated scale, which affords a means of controlling and, if necessary, correcting the anomalous indications given by the silver-chloride paper. In relation to this subject, M. Paris, the managing director of the *Societe Francaise d'Autotypie*, sends us some observations that he has made on working with the photometer. Our readers will, no doubt, be pleased to take cognizance of these remarks, as they tend to diminish the causes of failure in carbon printing. M. Paris does not hesitate to express an opinion that light will act equally and proportionately on two pieces of paper sensitized at the same time, one by silver chloride, the other by potassium bichromate, without regard to the influence of the time of day, the weather, or the theremometer. It is sufficient, he says, to establish, in terms of the unit of time, the relation between the decomposition of silver chloride and that of potassium bichromate. This calculation can be easily effected in two ways, according as we operate with silver chloride dry, or with silver chloride wet and slightly acidulated. Of these, M. Paris finds the latter more preferable. He takes a piece of unsized paper, and sensitizes it on a standard bath of hydrochloric acid diluted with water. He then floats the paper, while still wet, on a bath of silver nitrate; he next sponges it again, and puts it away between the leaves of a blotting-book. This paper must be used the same day, and while still wet. Our correspondent recommends that only so much photometric paper be made every day as the work of that day will require; at the same time, if it should get dry, the paper may be moistened a second time, but the operation must be executed with care, so that all parts of the paper become equally moist. From the chemical formulæ of silver chloride and potassium bichromate, two correlative numbers can be obtained, which may be called the co-efficients of sensibility of the two salts. By dealing only with the equivalent of oxygen which, under the influence of light, is given up both by wet silver chloride and dry potassium bichromate, M. Paris has found that taking the sensibility of silver chloride as corresponding to unity, that of potassium bichromate will correspond to 1·581. The conditions remain always the same when the chloride paper is exposed for the same length of time as the emulsified paper under the same light and at the same temperature. If one of these influences increased or diminished the actinic action of the rays of light, this increase or decrease will have the same proportional effect on the two papers. It is therefore possible to operate with certainty if care has been taken to first measure the opacity of the negatives, and then to work out the mathematical relation that exists between this opacity and the sensitiveness of the salts that are employed. M. Paris does not agree with M. Vidal in thinking that the amount of colouring matter contained in the emulsified paper should be estimated in order to determine the extent of the reduction or prolongation of the exposure. It is the colour of the material of which, as he maintains, account should be taken, and not of its amount. According to his observations of two papers containing the same quantity of gelatine and the same quantity (by weight) of colouring matter (blue in the case of one paper and black in that of the other), sensitized on the same bath, exposed under the same negative, and all other conditions being equal, the blue one requires about twice as long an exposure as that necessary for the black. These observations of M. Paris ought, as he thinks, to put photographers on their guard against attributing—as they often do—the cause of their want of success to the bad quality of the paper or tissue that they use, while very often they themselves are the delinquents, owing to their not having taken into account the absorbent and repellent properties that the coloured surfaces possess when the luminous rays fall upon them. It may, perhaps, be of advantage to take additional note of the formula adopted for his photometric paper by M. Leon Vidal, which, by the way, is the same as that recommended by Dr. Van Monckhoven. Take a piece of paper of Saxe or Rives, and plunge it for two minutes in a bath composed of 100 grains of sea-salt to 2 litres of distilled water, and dry it in the dark. The sheets of paper that have undergone this first treatment are next plunged into a ten per cent. bath of silver nitrate. They are then turned, and lifted out, piece by piece, and placed in a pan of water, where the excess of silver nitrate is removed. They are next hung up by of one their corners and left to dry. Paper prepared in this way is deficient in sensitiveness, and can only be of use with a photometer in which lumps of ammonium carbonate can be placed; under the influence of the ammonia it acquires great sensitiveness. ERNEST LACAN.

A REALLY EFFICIENT REGISTERING AND EFFECTIVE LANTERN-SLIDE CARRIER.

BY DAVID YOUNG.*

THIS carrier entirely obviates the nuisance of having to remember the size of the slide put into the lantern some time previously, and also the necessity of having to go though a course of lessons on numbers, names, and sizes, and then being able to register only about one-half the slides. All that is necessary is simply to remember that there are three sizes of lantern slides in common use —York's, Ferrier's, and Woodbury's—and whichever one is shown on the screen, the operator has simply to put it into the carrier, and push it as far as its slot will allow. What can be simpler?

The slides can be registered from either side of the carrier. This, in itself, is a great advantage over any carrier which can only register from one side. Another advantage amongst the host possessed by this carrier is, that the operator is not compelled to reduce the size of his pictures, and to have them always one shape, which may cut off an important portion of some pictures. The pictures may be of any shape wished by cutting a paper, card, or tin mask the desired shape, and putting it into the slot made in the carrier for that purpose; and, by having a variety of masks (which would cost almost nothing), the shape of the pictures may be altered at will, or the pictures may be left the shape the manufacturer thought best.



The same slot allows a blank, either dark or coloured, being used to imitate the curtain rising or falling, or a strip of paper or glazed calico, pierced to imitate falling snow or other effects; or by having very pale cold glass or gelatine as slides for the extra groove, various tints on the screen may be obtained, and by using two different colours as one slide, variety may be secured without adding to the bulk. By using blanks, either dark or coloured, in the same groove, sidewings opening and closing either from the side or centre may be imitated, or the pictures may be shown opening from the centre either vertically or horizontally any shape or colour. The slides may be passed through the carrier, panorama fashion, or produce a peculiar effect by passing the slides along both grooves. After using springs in my slide-carrier for years, I now find them quite unnecessary, as making the groove very slightly inclined answers every purpose. By having two very small rollers attached to the carrier, with a small piece of elastic tubing drawn over them, and a small handle to the end of one roller, you may have some of the effects to move in the most even manner.

This carrier—with which can be registered the pictures on the screen any shape, and have an almost endless variety of effects without disturbing either carrier or lantern—is, I think, by far the most portable carrier I have seen. It measures *seven* inches long, four and a-half inches wide, and less than three-quarters of an inch thick, and weighs only *three ounces three drachms*.

The construction of the carrier will, I think, be easily understood from the above rough sketch.

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

WE continue the abstract of this prize essay of Dr. Eder's. The publication of the *Photographische Correspondenz*, in which it appears, has been suspended since February last, in consequence of the editor, Dr. Hornig, being in Paris as a member of the Austrian Commission, and this accounts for the delay in its appearing in our columns.

The author proceeds to treat of the behaviour of chromo-gelatine in the presence of heat and moisture.

Premising that, when the contrary is not stated, every operation that he now describes is effected in a dark room, he points out that gelatine in the form of a solution, treated with potassium bichromate, and boiled for from five to ten minutes, does not, when subsequently dried, lose its original properties. But if the boiling be continued for several hours, and the water lost in evaporation replaced, the liquid becomes thick, and sets at a comparatively high temperature; if this chromo-gelatine be then dried and treated with cold water, it will indeed swell up, though not readily, but it will have lost for the most part its solubility in hot water. Boiling the chromo-gelatine for only fifteen minutes is sometimes enough to deprive it, after being dried, of its power of dissolving in hot water. The author, therefore, recommends that in practice a mixture of gelatine and potassium chromate should not be heated for a longer time than is necessary to dissolve the former, and if the gelatine has been previously soaked in water, a temperature of from 40° to 50° C. will be quite high enough. He adds that the greater the amount of chromate in the mixture the less soluble is the gelatine, especially when the films are dried slowly. Sensitized carbon tissue, after being dried for twenty-four hours, requires a water warmer by from 2° to 5° C. than before being treated with bichromate; unsensitized tissue is soluble at from 28° to 32° C., sensitized at from 33° to 35°.

On the question of grain, the author remarks that in general a gelatine containing a larger percentage of bichromate will produce grained films, whereas the less the admixture of the salt, the smoother the film. The temperature at which the film is dried, however, has an important influence on the formation of grain, as both a too low and a too high temperature will render the film free of grain. Certain substances that, when added to gelatine, tend to keep it liquid—such as acetic acid and calcium chloride—promote the formation of grain, even when the film is dried at a low temperature.

Thick films will have a coarse grain, and a very concentrated solution of gelatine produces a rough grain for printing. Old plates will have a finer grain than new ones. Of two plates dried at the same temperature, the one to which the air has the better access will have the coarser grain. Under exposure sunlight will give a finer grain than diffused light.

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* Read before the Manchester Photographic Society.

* Continued from page 184, April 18th.

Carbon tissue that has been sensitized in a dilute chromate bath produces more brilliant copies and harder prints than one prepared with a concentrated solution of chromate. Advantage can be taken of this property; thin and weak negatives should be copied on tissue that has been sensitized in a dilute (1 to 2 per cent.) solution of bichromate, dense and vigorous negatives on tissue sensitized in a more concentrated (5 to 6 per cent.) solution. A bath that is too weak gives no half-tones, one that is too strong produces reticulation.

Another important fact to which the author draws attention is the property of chrome gelatine to become insoluble in hot water if it be left in a moist and pasty state for some days, even at an ordinary temperature; this tendency can be observed in the course of less than twelve hours. Sensitized carbon tissue that is kept wet for any length of time gives poor prints. With collotype plates this property takes a longer time to make its appearance, because the films do not lose their power of swelling up in the same degree as their capability of dissolving in hot water. In photo-electrotyping, therefore, and in all processses where the complete solubility of the unexposed gelatine is necessary, a plate should not be allowed to remain moist for more than twenty-four hours. Carbon tissue, which in damp weather takes a long time to dry, is developed with difficulty, and the result is not so clear and brilliant as with tissue that has been dried quickly: this tissue should, therefore, not take more than from six to eight hours in drying. For the above reasons chromo-gelatine should be dried quickly, but at a low temperature. As a general rule, sensitized carbon tissue should be used within from one to three days of its being prepared, as it may, with tolerable certainty, be assumed that in that period no change in its constitution has taken place; in cool weather it will keep twice as long as in hot, and when sensitized in a concentrated bath it is more durable than when sensitized in a dilute one.

On the influence of atmospheric moisture on the durability of chromo gelatine the author dilates at some length, and gives the results of his own observations. Paper coated with chromo-gelatine can be preserved from decomposition longer in a drying box containing calcium chloride than in an ordinary room. At the end of a week, if it be attempted to produce a print, the difference is very marked. The paper kept in a drying box is much more soluble in hot water than that left exposed to the air in a room, and the latter has a much greater tendency to fog. Such a piece of paper, kept in a box whose bottom is covered with water, and when the air is saturated with moisture, becomes insoluble twice as quickly as it would be in the air; in a week's time it will have become completely insoluble. On this account chromo-gelatine films must be preserved in a perfectly dry atmosphere, if they are to be kept in a serviceable condition for any length of time. However, sensitized tissue, which has been dried in a dry atmosphere, gives clearer and purer prints than that dried in a less dry atmosphere.

From all the conclusions above stated, we gather that in order to keep a film of gelatine soluble in hot water it must be dried quickly. In general, it will suffice to hang up glass plates, or papers, coated with chromo-gelatine, in a dark room, or in a well-ventilated but light proof closet. Of course, the time that they take to dry will depend on the state of moisture of the atmosphere. To obtain positive indications on this point it is necessary to work with some instrument that measures the hygrometric condition of the air, and none is better for the purpose than the psychrometer, consisting of dry and wet bulb thermometer. From the difference of the temperatures indicated by these, both the absolute and relative moisture of the air may be determined.

The smaller the relative moisture the quicker is the evaporation. When the former is considerable, drying the chromo-gelatine in the air is not advisable, because it would take place too slowly. On this account the temperature of the air in the drying room should not be allowed to fall below from 20° to 25° C., and the difference of the wet and dry bulb thermometers should be 5° or 6° C. This would give a relative moisture of from 45 to 55 per cent., and a vapour-pressure of 8·0 to 15·7 mm. In winter, when the atmospheric temperature is low, the absolute quantity of moisture in the air is small, and on that very account, in a room artificially heated, the air is comparatively much drier, and, therefore, the evaporation greater than a summer day when the external atmospheric temperature is the same as that of the air in the room; whence the apparently paradoxical result that gelatine films can be dried in a dark room more rapidly in winter than in summer. It is, therefore, of importance to have a psychrometer of some kind in the laboratory.

When, however, the circumstances are such that the drying cannot take place quickly in the air, it will be necessary to have recourse to artificial means. The best of these is to hang up the films of gelatine in a drying box whose floor is sprinkled with lumps of calcium chloride; shallow pans of sulphuric acid may be substituted for the salt, though this method is recommended so strongly. Gelatine will dry in this way very quickly (if the films be thick they will take about twenty-four hours), without losing their solubility in hot water.

These artificial drying processes are only used for the thicker films of chromo-gelatine, mostly supported on glass plates, such as are used for photo-relief printing and photo-electrotyping. Collotype plates are better dried at a high temperature, on account of the grain which they thus acquire. Carbon tissue, sensitized by floating on a solution of potassium bichromate, dries quickly when hung up in a current of air, and the employment of calcium chloride is not necessary in this case.

Instead of desiccating the air, and using it at ordinary temperatures for drying the films, the effect may be produced by means of special drying ovens at tolerably high temperatures. This method is less costly than the one with calcium chloride; but care must be taken not to raise the temperature too high, as the films are exposed to the heat for some hours before they get quite dry. In fact, the temperature must in no case exceed 60° C.

It should be noticed also that a chromo-gelatine, whose solubility in hot water must be completely maintained for the developing process, requires a more careful manipulation, and a lower temperature (about 40° C.) in drying. Collotype plates may be dried without harm even at 70° C.; but to be on the right side, the temperature of the drying oven should be kept at between 50° and 60° C. The films will then take from three to ten hours to dry completely; at 25° or 30° C., from sixteen to twenty-four hours are necessary; and at 70° C. they will be finished in from one to two hours. Of course these numbers will vary with and depend upon the thickness of the films with which the plates are coated. It is noteworthy that gelatine films when rapidly dried are capable of resisting mechanical pressure; films that have been slowly dried are softer. When the drying has taken place too quickly, bands of different texture will be formed, which will appear when on the prints. Rapidly dried films have a dull surface, whereas those dried more leisurely are brighter.

The conclusions that are derived from these considerations, therefore, are that under no circumstances must too high a temperature be employed in drying chromo-gelatine. Rapid drying and low temperature are the two conditions which the photographer must endeavour to maintain; and as one of these modifies the other, he finds himself compelled to work within certain narrow limits, to overstep which is full of danger.

(To be continued.)

PHOTOGRAPHIC PRINTS BY A DYEING PROCESS.

BY E. KOPP.

The article which follows appeared in our pages just before the renaissance of carbon printing produced by Mr. Swan's discovery, and, consequently, at a time when its interest and importance could be scarcely properly estimated. We are satisfied that we shall be doing many of our readers a service in reproducing and commending it to the attention of carbon experimentalists.

The potassico ammoniacal chromate salt, either pure, or with the addition of an ammoniacal salt—the acid of which may vary according as we wish to modify the reaction, more or less—is an excellent photographic agent, as the non-decomposed salt does not attack cellulose. It is especially adapted to the obtaining of positive pictures by means of negatives obtained by the ordinary methods.

The paper must be impregnated with a concentrated solution of the salt, and allowed to dry in the dark at the ordinary temperature.

The paper remains yellow, and only after a long space of time gradually assumes an orange yellow tint. It continues active for a very long while.

But when the paper prepared with this salt is exposed to daylight, and especially to the sun's rays, in a very short time it acquires a brown hue, becoming deeper and deeper, and more intense.

If the prepared paper is covered with an engraving, and then with a glass plate, to keep the engraving in close contact with the paper, after a few minutes' exposure to sunshine, a very distinct negative picture appears on the paper. If the engraving has been previously waxed or oiled to render it transparent, or if an ordinary collodion negative be employed, two or three minutes' exposure to the sun's rays will suffice to produce a very decided effect.

If the paper be now washed in pure water, or in water very slightly acidulated by one or two drops of acid, the unchanged chromate is dissolved; the picture is then fixed, and may be dried in daylight with impunity.

It is, however, important not to prolong the washings longer than absolutely necessary, if it be desired to retain the characteristic yellow-brown tint, and not submit it to further treatment.

It appears to us beyond a doubt that the potassico or sodico-ammoniacal chromate may advantageously replace the bichromate of potassa in all photographic processes in which this latter salt is used—as, for example, for gelatine, carbon, and similar processes.

It is easy to explain the reaction by which the picture is produced, and the manner in which it behaves under various circumstances presents a certain interest.

Under the influence of light the potassico-ammoniacal chromate loses ammonia, becomes acid, and the chromic acid, acting then upon the cellulose, it partly oxides, and is itself reduced to the state of brown chromic sur-oxide $Cr\,O^2$

This sur-oxide $Cr\,O^2 = Cr^3\,O^6 = Cr\,O^3, Cr_2\,O^3$, may also be considered as a chromate of chromium—that is to say, as the result of the combination of chromic acid with green oxide of chromium, and, in fact, even under the influence of very feeble affinities it is readily separated into chromic acid and oxide of chrome.

It suffices for a very prolonged washing with pure water, and especially with an alkaline or a merely calcareous water, to dissolve out all the chromic acid, and only oxide of chrome to remain as a residue.

It is for this reason that it is important not to prolong the washing of the photographic pictures. The brown picture becomes paler and paler, until at last it presents only the light green tint of the hydrated oxide of chromium.

But if this ready decomposition of the compound $Cr\,O^2$ is in this respect an inconvenience, it presents equal advantages in other respects.

It permits the having recourse to operations of a different nature to strengthen the picture anew, and to fix it in a permanent manner.

For in the chromic sur-oxide there is found temporarily fixed upon the paper both chromic acid and oxide of chromium, and each of these two compounds is susceptible of entering into new combinations, possessing a much more intense colouring power than $Cr\,O^2$.

1st. If we wish to fix the chromic acid, we have only to submit the exposed paper, previously washed, to the action of metallic salt, capable of forming insoluble chromates (even in a liquid slightly acid), and strongly coloured; such are the chromates of lead, bismuth, silver, mercury, &c.

Thus, to name only one example, in placing the photographic paper in a very weak but clear and limpid solution of nitrate of mercury, as neutral as possible, the picture immediately acquires an orange-brown red tint, very vigorous, in consequence of the formation of mercurial chromate.

A salt of lead, or of bismuth, gives a yellow picture; a salt of silver gives a crimson picture.

But this is not the limit of the transformation: once the picture is fixed in the state of insoluble metallic chromate, we can thoroughly wash it, in order to remove all trace of the soluble metallic salt of the white portions of the picture, and then there is nothing to prevent our submitting it to the action of sulphuretted hydrogen, or the alkaline sulphides; and thus transforming the yellow, or orange, or brown-red picture, into a black one, more or less intense. By this mode of proceeding, we perceive that the chromic sur-oxide is only the means of fixing various metallic salts upon the paper, in quantities proportionate to the intensity of the shades, which, when once fixed, may be rendered apparent by very different reactions, if they do not already, in the state of chromate, consitute a picture of a tint or hue that it is desirable to retain.

As the reactions accompanying the phenomena of colouring are extremely varied and numerous with the metals proper, which are just those which are fixed in the circumstances indicated, it may be foreseen that some among them may be turned to practical account. To give only one example:—If we immerse the picture formed by the mercurial chromate in a dilute solution of hyposulphite of soda, we perceive the orange-brown tint immediately pass to a black, more or less grey or brown, in consequence of the formation of the black sulphide of mercury.

2nd. Instead of having regard to the chromic acid, we may obtain new effects by operating upon the chromic oxide resulting from the decomposition of $Cr\,O^2$.

It has already been stated that in leaving the picture formed by $Cr\,O^2$ for a long time in water, and especially in calcareous water, all the chromic acid at length gradually disappears, and there remains only the hydrated oxide of chromium upon the paper. This effect is obtained much more rapidly by washing with a warm dilute solution of carbonate of soda, or with ammonia or other salt possessing an alkaline reaction, always finishing by washing in pure water.

But the hydrated oxide of chromium acts as a mordant, and it follows from this that it is only necessary to immerse the paper thus modified into a bath of colouring material capable of being altered and fixed by the chrome mordant, for the pale green picture to come out with hues produced by this actual dyeing process. These colouring matters are very numerous, such as alizarine, purpurine, Brazil wood, logwood, &c. It may readily be imagined that extremely varied effects may be produced in this manner.

Logwood especially undergoes this transformation very readily. It is not necessary that the $Cr\,O^2$ be entirely converted into $Cr^2\,O^3$, only to wash it sufficiently for no non-decomposed chromate to remain upon or in the fibre of the paper. The chromic acid which still remains in small quantity combined with the oxide of chrome operates favourably in modifying the blue-black tint of the logwood. Also, after immersion in a recently prepared warm bath of logwood, the picture assumes an extremely deep blue-black tint. The whites also become strongly coloured after a certain lapse of time; but it is easy to restore them. After washing the tinted paper, immerse it in a very dilute warm solution of chloride of lime, and then the non-mordanted parts bleach very rapidly, and the picture quickly reappears. The action of the chloride is stopped as soon as the desired tone is produced, and the proof is washed and dried.

We may operate with other colouring matters in an analogous manner, modifying the operation according to circumstances and the particular nature of the colouring materials. The paper, however firm and strong it may be, presents very great inconveniences for this kind of preparation. In the prolonged aqueous baths, especially if warm, the fibres of the papers separate, and the picture loses its sharpness; and, moreover, the paper almost always contains mineral matters—such as chalk, alum, &c.—which have a greater or lesser affinity for the colouring matters.

These inconveniences are inherent to the nature of ordinary paper, and to diminish them it will perhaps be useful to employ paper prepared in a particular manner; for example, parchmentized paper, so that the fibres cannot so readily separate from each other, and be exempt from matters capable of acting as mordants.

Evidently there is nothing to prevent the substitution of fine linen for the paper, and operating upon it in an exactly similar manner. The reactions we have pointed out may certainly be viewed as constituting one of the phases of the application of photography to the production of designs upon textile fabrics. Many of the manipulations which are difficult, if not impossible upon paper, present no difficulty in operating upon cotton, silk, or wool.

3rd. The compound $Cr\ O^2$ fixed upon paper and upon linen offers also another series of reactions, many of which may be turned to account. They are based upon the property of $Cr\ O^2$ acting as a sur-oxide, readily abandoning its oxygen to pass to the state of oxide, and of exercising, in consequence, a strongly oxydising action.

In putting in contact with $Cr\ O_2$ a body which, by oxydising, gives birth to an insoluble compound, this compound fixes itself upon all the points where it encounters the chromic sur-oxide.

Among organic compounds there are many which fulfil this condition, and which, moreover, become coloured in tints more or less deep; such are, for example, certain pyrogeneous acids, astringent substances, many anilic and naphthalic combinations, &c.

We find them also in the mineral kingdom, and, to instance but one example, we shall state that upon immersing paper coloured by $Cr\ O$ in a cold dilute solution, and quite neutral, of a ferrous salt (sulphate or chloride), we find in a certain time that oxide of iron is precipitated upon all the places impregnated with chromic sur-oxide. The oxide of iron can now serve as a starting point for a complete series of coloured transformations, either by dyeing process, or in consequence of the production of characteristic ferrous combinations (prussian blue among others).

By associating the potassico-ammoniacal chromate with other salts readily decomposed, such as the yellow and red prussiates, we can obtain varied effects and pictures which admit of other kinds of transformation. It is thus, for example, that paper covered with a mixture of a solution of yellow prussiate, ammoniacal chloride, and of potassico-ammoniacal chromate, gives, after exposure and washing, a yellow brown picture, which, under the influence of a perfectly neutral and dilute solution of a ferrous salt, yields pictures of a very agreeable tint, which are themselves susceptible of being modified in a host of different ways.

Correspondence.

A "NEW" PHOTOGRAPHIC OPTICAL PATENT.

Sir,—In your impression of September 20th, page 447, I noticed, in your German Correspondence, a paragraph reprinted from the *Philadelphia Photographer*, bearing the above heading.

Not being an optician, and not having even tried the experiment referred to by Dr. Vogel—viz., that of obtaining a stereoscopic effect in a single picture by the employment of a lens having a diaphragm with two apertures, one at each edge, instead of the usual single aperture in the centre—I am not prepared to offer any opinion as to its merits or demerits; but, seeing that the principle of using a double aperture to produce a single image which shall appear stereoscopic has been put forward as a new invention, and protected by a patent, I have felt it my duty to draw the attention of those photographers who may wish to try the experiment to the following few lines which formed part of a letter to the Journal of the Photographic Society of Great Britain, September 21st, 1855. The letter is written from Hull, and signed George Norman. It says:—

"With the method now about to be described I think tha after some improvements have been made in the instrument we shall be enabled to obtain at once, with the camera, single pictures which will possess all the magic effects of double vision. The experiment being hitherto only a rough one, and performed with an ordinary camera and lens, must necessarily be imperfect in its workings; still I have every belief that when a lens is made specially for the purpose the suggestions can be carried out with perfect success. The method is exceedingly simple, and the experiment may be easily performed with an ordinary camera and lens. My lens (a three-inch landscape one by Ross) has, as usual, two or more diaphragms in the tube; these diaphragms I remove entirely, and substitute in their place a temporary one of thin wood having two small apertures, one at each side, and about two and a half inches apart. On screwing the tube to the camera, the picture represented on the screen will be confused and indistinct, owing to the various objects composing the view being double in all its parts. On sliding the tube backwards and forwards, the double lines approach or recede from one another as the case may be. When, however, the focus is obtained, the two pictures coincide, and the view is stereoscopic to a wonderful degree. With a lens constructed for ordinary purposes the effect is not so satisfactory as might be desired, but, as before stated, I have little doubt but that a properly constructed one will soon be made for the purpose."

I think after a perusal of the above extract that no one will feel inclined to pay thirty marks for the privilege of having an old idea placed before them in the same imperfect form in which it was left twenty-three years since.

If there is any merit in the discovery, let it be given to Mr. Norman (who published his invention in the hope that it might be of some practical use), and not to those of whom there are now too many in the photographic world, who seize on a forgotten experiment, and announce it as a new invention.

To my mind, however, a good photograph always appears somewhat stereoscopic, for is it not the desire of every artist to make his pictures appear as round and life-like as possible? And the nearer a stereoscopic effect is obtained, the more life-like is the picture.—I remain, sir, yours obediently,

57, *Ludgate Hill, Sep. 23rd.* E. Clifton.

[The idea of getting stereoscopic effect in a single image has been attempted in various ways, and often discussed; but it is altogether a fallacious idea, and cannot be realized.—Ed.]

ERRATUM—*RE* SWAN'S PLATES.

Sir,—Will you allow me to correct a mistake which has arisen somehow between the Secretary of our Manchester Photographic Society and yourself? At the last meeting of that Society, your report says Mr. W. J. Chadwick showed some results on Swan's plates: "One of the negatives represented Mr. Chadwick holding a wax vesta, by the light of which it was taken." It should have said:—"A transparency printed from a negative (portrait of himself) by the light of a wax vesta."—Yours,

W. J. Chadwick.

Proceedings of Societies.

OUT-DOOR MEETING OF THE MANCHESTEE PHOTOGRAPHIC SOCIETY AND THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

ON Saturday last, the 21st instant, the above-named societies met together at Hawarden, the residence of the Right Hon. W. E. Gladstone, who had kindly given permission to photograph the old and new castles and other views in the beautifully-situated park. On arriving at Hawarden they were welcomed by Mr. Gladstone, who informed them of the most likely points of interest where views and "bits" might be taken.

A more charming day for photography could not have been chosen, and though the afternoon was a little cloudy, and the light rather poor, the morning was all that a landscape photographer could desire, giving an opportunity seldom to be had of securing views with beautiful trees and foliage perfectly motionless.

The old castle, being a morning view, and surrounded with ivy and light-foliaged trees, was one of the principal subjects for the camera.

Hawarden at the Conquest was held by Barons of Monthault (now Mold) under Hugh Lupus, Earl of Chester. It then fell to the Stanleys, but after the execution of James, Earl of Derby, in 1651, it was forfeited and sold to Serjeant Glynne, Lord Chief Justice and one of Cromwell's Privy Council. The present castle was built by Sir John Glynne in 1752.

Several excellent views were obtained of the new castle, and here a group was taken by Mr. L. W. Weber and Mr. J. H. T. Ellerbeck, with the castle for a background.

Soon after four the party mustered at the Glynne Arms Hotel, where about thirty sat down and did ample justice to a substantial tea, the President of the Manchester Photographic Society, Mr. Alfred Brothers, F.R.A.S., in the chair. After tea another group was taken by Mr. Potter and Mr. Ellerbeck, and then a start was made to the railway station for home. The group taken by Mr. Potter on a collodio-bromide plate, and the one by Mr. Weber on a Kennett emulsion plate, proved exceedingly successful.

On counting up the results of the day, twenty-two cameras had been used, and one hundred and ten negatives taken, almost every dry process of the present day being represented, besides which several had been engaged in sketching and painting.

It was agreed on all sides that a most pleasant day had been spent, and that another reunion of the two societies should be arranged.

In order to avoid any complaints of too short notice, the Secretaries of the respective Societies desire to announce that it is intended to have a joint excursion to Miller's Bale in June next.

Talk in the Studio.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The first meeting of this Society for the winter session will take place on Thursday next, October 3rd, in the rooms of the Society of Arts, Adelphi, when Mr. E. Dunmore will read a paper entitled "Varieties"; and Mr. F. York will narrate some of his experiences during his trip to Paris.

PHOTOGRAPHS OF THE WRECK OF THE "PRINCESS ALICE."—Professor Abel, the War Department Chemist, has, with the consent of the War Office, permitted his staff of photographers at the Chemical Establishment of the Royal Arsenal to take views of the wreck of the "Princess Alice," as it lies on the foreshore at Plumstead, and partly within the Arsenal boundary. When beached, the two portions of the vessel were placed with their open ends next the river, in order that the water which entered with the rising tide should drain off at the ebb; but this has rendered the examination of the fractured parts a matter of difficulty, and the task of photographing those parts more difficult still. The work, however, has been surmounted by means of rafts, and, by taking advantage of dead low water, some very good negatives have been obtained, from which prints will be taken for the coroner's jury and the Board of Trade inquiry. It is said that the last time the "Princess Alice" was photographed was the occasion when she was painted, gilded, and decorated for the conveyance of the Shah of Persia through the Pool and the Docks, crowded with shipping, to Greenwich Hospital and back to Westminster in memory of which service she has been known on the river ever since as "the Shah's yacht." Her sister ship, the "Albert Edward," which may generally be seen moored above London Bridge, resembles her closely in every particular.

DURABILITY OF THE FERROTYPE.—"This was proved," our Philadelphia contemporary remarks, "lately in a most singular manner. During the encampment of the soldiers of the late war, on the field of Gettysburg this summer, a man of peculiar taste desired to obtain a skull and cross-bones; and to gratify this wish he determined to dig up the graves of some Confederate soldiers who had fallen and been buried on that battle-field. An old farmer residing there pointed out to him two graves. One of these was opened; the skeleton of a man was found who had been shot through the head; a badge or some buttons told that he belonged to the Fourteenth Georgia Regiment. On his breast was a ferrotype, supposed to be that of his wife and two children; the case had perished, and the gilt rim around the picture was tarnished, but the gold on the pin and earrings was as bright as the day the photographer had put it there, and the whole picture was in a state of perfect preservation, though it had lain in that grave for fifteen years and fourteen days, while the mortal remains of him who once cherished it had wasted away till nothing but dust and bones remained."

To Correspondents.

MARGATE.—A correspondent, who has forgotten to sign any name, writes to us from the Fort Studio, Margate, asking for information regarding advertising in the French journals. The best course our correspondent can pursue is to write to Mons. Ernest Lacan, Editor of the *Moniteur de la Photographie*, 21, Avenue de la Grande Armee, Paris, who will doubtless furnish the information required.

T. COAN.—We have not heard of such a process as you describe being applied to printing on fabrics; but, from the description you give, it is probably a uranium process, in which the yellow solution is a solution of nitrate of uranium. The fabric being treated with this preparation, and exposed under a negative, will yield a faint, or possibly invisible image, which may be developed by the application of a solution of chloride of gold. Of course we cannot give details of a special process of which we have not heard, but our correspondent will find many hints on the use of uranium in the early volumes of the NEWS, and in the eighth volume many exhaustive articles were devoted to the subject, at the time when the Wothlytype process was introduced to the public. Unanium salts constituted the special element of that process.

AMATEUR PRINTER.—It is important, in preparing your own paper, to bear in mind certain important principles. A highly salted paper renders desirable a strong nitrate bath, whilst a weakly salted paper may be used with a weak silver bath. A highly salted paper and strong bath is the most sensitive, and will yield harmonious prints from a somewhat hard and dense negative. A weakly salted paper will give the most vigorous prints, if your negatives be thin and weak. With a dense negative, print in direct sunlight; and with a weak negative, print in diffused light, or even through ground glass.

J. M. F.—In our own experience we have not found good methylated spirits injurious in collodion. For varnish it will answer well; but with some samples of collodion it is apt to dissolve the film. It contains wood naphtha, which is a solvent of pyroxyline. 2. We cannot tell you the precise terms upon which photographs are published. Much depends on circumstances. Write to a firm like Marion and Co, Soho Square.

E. J.—With some varnishes no treatment is required to render the surface suitable for pencil retouching. A thin spirit varnish will often give a suitable surface.

ZYŒ.—The solar camera arrangement of Mr. Stuart, to which you refer, was described and figured in the seventh volume of the PHOTOGRAPHIC NEWS, p. 533, November 6th, 1863.

J. N. C.—Ferrier's transparencies are said to be produced by the dry albumen process. It was described in the NEWS some years ago; but is generally held to be a secret process.

SPICER ADEY.—Your letter and enclosure received. We will endeavour to put matters in train for carrying out your wish.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Mr. F. SPALDING, Chelmsford,
Two Photographs of Archdeacon St. Johd Mildmay.
Mr. H. W. BEVAN, Lowestoft,
Photograph of Free Methodist Church, Lowestoft.
Mr. J. PATRICK, Kirkcaldy,
Two Photographs of Wemyss Castle.

The Photographic News, October 4, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Employment of Photography in Meteorological Science.

Lately, the Astronomer-Royal has undertaken to tell us how much sunshine we get from week to week. He would be a bold man to question any of Sir George Airy's observations or results, and we do not purpose to do so here, for we take it that the data which are published from time to time on this head are simply to be looked at relatively, and do not pretend to give us more than general information. One citizen might say to another that the weather in London was both warmer and brighter at one time than another, and refer to the Astronomer-Royal's reports in confirmation of the fact that there were twice as many hours of sunshine to bring about the result; but, beyond being generally comparative, we doubt whether the Greenwich observations have any value whatever. In the first place, we might well ask what is meant by sunshine. As every photographer knows, there is sunshine and sunshine on a summer's day—a soft, hazy light, when the shadows are transparent, and when the most delicate of landscape pictures may be secured; and the blinding glare after rain, when the sky is of an intense blue, and when shadows are cast so black that the most skilful of masters would have a difficulty in securing a soft and detailed photograph. Is it sunshine whenever a shadow is cast, no matter how faint the latter may be? Is it sunshine when the sun plays fast and loose behind the cloud masses, causing the photographer to be watchful and diligent with the lens cap? Again—and this point is more important still—is it fair to judge of sunshine, even so far as London is concerned, by observations taken at Greenwich? The Observatory, though on an eminence, is no higher than Blackheath and other suburbs, and is, moreover, so close to the river and the noisome factories on the Isle of Dogs opposite, that it must get an unusually large share of mist and fog. The atmosphere anywhere about a coal-burning city like London must be far from transparent, but places bordering upon the river are at another disadvantage from mist. Where the Paris Photo-Astronomical Observatory is now located, at Meudon, much farther from the French metropolis than Greenwich is from the heart of London, complaints are rife even there as to the impurity of the atmosphere. The Chateau of Meudon, where M. Janssen has his instruments, is situated in an open park at a short railway journey from Paris; and although, as our readers know very well, there is but little coal consumed in that city, and, as the white buildings testify, the atmosphere is much less impregnated with soot and vapours, still, evidence is not wanting that the proximity of the metropolis materially interferes with the photographic, if not the optical, observations undertaken. If, then, M. Janssen complains, as he has repeatedly, that certain of his results are injured by the Paris atmosphere, how much more must be the case in observations taken in London itself, where coal black smoke and river mists are prolific! No doubt at Kew, where for some years past pictures of the sun have daily been secured, the atmosphere is purer and more transparent, but even that district is not likely to compare favourably with Meudon, of which M. Janssen finds fault. So that, as we have said, the records of sunshine taken at Greenwich can have but a generally comparative value. To secure data of any scientific worth, it would be necessary to have a station sufficiently distant from the baneful influences of town, where the results would not be subject to variations from artificial causes. Moreover, we should think that some other unit better than "hour of sunshine" could be fixed upon with advantage. There would be little difficulty in measuring the actinic power of the sun every day; and if only a sound unit of measurement were adopted, a far more trustworthy record would be the result. For instance, if we knew that so many degrees of sunshine were shed upon the earth, which degrees were measured by a proper actinometer, the result would, at any rate, give a scientific man a better means of judging the solar influence than simply expressing it in hours of sunshine. As we have pointed out, an hour of sunshine—even in summer—may mean twenty degrees by the actinometer, or it may mean forty; and there is, again, the same wide difference between the hours of summer sun or winter sun. It is true actinism is not everything, and to judge by it alone would doubtless be open to question; but most photographers will bear us out in saying that, practically, the amount of actinism in sunshine is very much in the same ratio as its light and heat. In the week ending the 29th of June, which seems to have been the hottest we have had this year, there were no less than 73·9 hours of sunshine; or, in other words, the sun shone for nearly two-thirds the whole time it was above the horizon. No doubt photographers who were busy printing during that week would remember it, when they were able, probably, to get through as much work as in the fortnight ending the first of June, when we enjoyed, according to the Astronomer-Royal, but 65·7 hours of sunshine in all. Fortunately, in summer, the photographer has generally quite enough printing time at his disposal, and therefore he is not so watchful of the weather; but his "printing book," during the short days, would often give valuable information, if he could but read it. Some really practical good might come if photographers would only jot down from time to time their observations in respect to actinism, and, as a careful meteorologist watches his barometer, set down, daily or periodically, records of the sun's power. For some time it was supposed that the spots on the sun's surface had something in common with drought and rain, and photography was set to work to watch these spots. But it has turned out, apparently, that, not for the first time, scientific men had been a little too eager to jump at conclusions. "Sun spots and famines," a subject on which many astronomers busied their pens a year ago, are not so closely connected as was supposed, and a close examination of the results of several years shows us that there is nothing to connect the amount of rainfall with more or less spots on the sun's surface. Photography, therefore, so far as it expected to find out anything about rainfall by closely observing the sun's disk, has failed to accomplish its purpose; but, on the other hand, there seems every reason to believe a photographic record of the clouds, or cloud formations, from time to time, would teach us something more about our changeable weather. Professor Piazzi Smythe, the Scotch Astronomer-Royal, suggested this some time ago, and the subject has several times been mooted in these columns. Now, however, attention has once more been directed to the matter by the *Times*, which says:—"At a single station neither the height nor the rate of motion of clouds can be determined. But from two stations a mile or so apart the distance, height, and motion of any cloud could be very readily determined. If photography, indeed, were employed, such instruments being used that the height and bearing of every point in the sky-pictures would be known, records of great value could be obtained, not merely for weather prediction, but for the study of the as yet unknown movements of those regions of the air in which cirrus clouds are formed."

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PHYSICS IN PHOTOGRAPHY.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

These last experiments were remarkable in another point of view, as they opened out the question as to whether the salts of silver might not prove sensitive to rays to which they had been supposed hitherto to be insensitive. Silver iodide, for instance, when exposed to the spectrum in a solution of potassium sulphite proved sensitive as far as "*a*" of the spectrum instead of stopping short at the point indicated in Fig. 2 (p. 446); and silver bromide in the molecular grouping which absorbed the red proved sensitive to a wave-length of somewhere near 11,000, whereas in its normal state 9,600 was its limit.

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* Continued from page 531.

Similarly, silver chloride proved sensitive to an extent which presumably may be increased till it is equal to that of the bromide. In both these instances we have a proof that the compound was sensitive to these abnormal rays, and that the image formed by those rays was destroyed as soon as formed, by their oxidising action giving an undevelopable form of salt. It may be remarked that by exposing films in reducing solutions, such as ferrous sulphate and pyrogallic acid rendered very slightly alkaline, that an image can be developed as fast as it is formed.

The natural outcome of the experiments on the oxidation of the photographic image just narrated is, that it should lead to the solution of the problem of photography in natural colours, such as that of Becquerel, Niepce de St. Victor, and others. In the the fourth edition of Hunt's "Handbook of Photography," we read at p. 161, "Niepce de St. Victor has made many experiments to produce the colours upon salts of silver and copper spread upon paper, but without success; the metallic plate appears absolutely necessary, and the purer the silver the more perfect and intense is the impression." The following is recommended as the most effectual mode of manipulating:—"The plate is highly polished with tripoli powder and ammonia; being perfectly cleaned, it is connected with the battery, and plunged into the bath prepared in any of the ways stated. [The baths were made from ferric chloride, cupric chloride, hydrochloric acid, &c.] It is allowed to remain in the bath for some minutes, taken from it, washed in a large quantity of water, and dried over a spirit-lamp. The surface thus produced is of a dull neutral tint, often almost black; the sensibility of the plate appears to be increased by the action of heat, and, when brought by the spirit lamp to the cerise red, is in its most sensitive state."

"The sensibility, however, of the plates is low—two or three hours being required to produce a decided effect in the camera-obscura. . , . These, when I first saw them, were perfectly coloured in correspondence with the drawings of which they were copies, but the colours soon faded, and it does not appear as yet that any successful mode of fixing the colours has been discovered." The coloured spectra which Becquerel photographed were produced in a somewhat similar way, the variation from which need scarcely be repeated.

In Hunt's work we also find that natural colouration of photographs was found to be possible by one or two other processes, but that the above gave the most satisfactory results. Mr Simpson also noticed, when using an emulsion of silver chloride, and after exposing the film to white light so as to tint the surface with a lavender colour, that he was able to reproduce on the film the tint of different coloured glasses to which such a surface might be exposed.

It will be noticed that the coloured spectra were produced on a dark compound of silver which gradually responded the colour falling on it. We have first a case of total or nearly total absorption of all the rays, and a subsequent production of compounds of varying tints. In order to produce any variations of colour it is only necessary that we should have at the most three molecular groupings, one of which should absorb the blue and green, another the green and red, and the last the red and blue. Whether the number of groupings may be reduced to two is a question of future consideration. In Lockyer's note, read before the Royal Society on June 11, 1874, "On the Evidence of Variation in Molecular Structure," we find statements which might have been conceived to be almost too bold at the time when they were made, but which subsequent investigations seem to prove to be exact. In this note he refers to definite molecular groupings of compounds and the absorption caused by them, and indicates that we may have a group which will absorb at the blue end, and another which will absorb the red end of the visible spectrum. It has already been shown that the silver bromide can be reduced to two groupings, one absorbing the blue and the other the red, and it is somewhat remarkable that, by applying pressure to the latter molecular grouping, it is gradually resolved into the former grouping, and passes through all tints of spectrum between the blue and the red. It must be remembered that these colours are not the colours of thin plates, but are totally independent of the thickness of the film so long as light can penetrate through it. It is not too much to assume that if silver bromide can be made to group itself into these two states, that the sub-bromide when oxidized should also assume a similar molecular condition. With this compound in a state which practically absorbs all rays, it is easy to imagine that particular sets of vibrations may cause it to resolve itself into groupings which answer to them. We have, in fact, the inverse of the reduction of the silver bromide by different portions of the spectrum. It is found that one molecular grouping can be reduced by a whole series of vibrations; thus the blue-absorbing molecular group is altered by all the radiations from the ultra violet to the yellow, and the red-absorbing molecular group by the radiations from the ultra-red to the green. If there were a green-absorbing molecular group, of which there is a strong suspicion of the existence, it would probably be altered by radiations from the blue to the orange. If, then, one silver compound can exist in two or three states of molecular grouping, it is quite within the range of reason that the oxidised compound should exist in the same three groupings. The black compound to which we have already referred, in fact, does arrange itself thus, probably by a re-arrangement of molecules, as formed when it absorbs oxygen. If a plate be prepared in a similar manner to that described above, and if it be exposed in an oxidising medium, these groupings are attained rapidly, a few minutes sufficing where previously hours were required. The images thus formed, however, appear not to be unchangeable, as exposure to white light, or to any colour except that in which the re-arrangement takes place, causes the colours to fade. The feat of producing *permanent* photographs in natural colours is as yet unsolved, but it may not be so far distant as may be imagined. In order to obtain them it is necessary that a method should be found by which the molcular groupings of metallic silver can be formed in either of the two (or three) states already described. As is well known, the absorption by metallic silver in a thin film takes place entirely in the red end of the spectrum, but it is a fact well known to photographers at large, that in certain processes it is perfectly feasible to obtain silver in which the transmitted light is of a pink red colour, whilst tints varying from indigo, passing through olive green to rich brown, are familiar. In order to obtain permanent photographs in natural colours, the object to be sought is a method by which the sensitive silver compound may be reduced by the red rays to a molecular grouping, which on development (probably by the alkaline method) shall be grouped into the red-transmitting molecular grouping, and so on. When this is discovered, the leap between mono-chromatic pictures and chromatic will have been taken, and the once apparent improbability have become more than a possibility.—*Nature.*

(*To be continued*).

THE MODERATOR ELECTRIC LIGHT.*

All these and a great many more considerations of a similar practical nature presented themselves to the mind of a fifth Russian gentleman, M. J. Rapieff, who has of late been investigating the subject with the view of eliminating the defects of the Jablochkoff and other systems to which we have referred. His main object was to produce an absolutely fixed point of light in connection with a subdivision of the electric light, securing perfect continuity of illumination irrespective of the necessary changing of the carbons or of the accidental interruption of the current. Having recently paid a visit to the Electric Lighting Works, 19, Middle Street, London, where we carefully examined M. Rapieff's apparatus and its working, we are in a position to state that he has succeeded in accomplishing his object in a highly scientific and practical manner. The light is produced from two pairs of carbons placed one above the other, the upper pair being inclined towards each other in V form, and the lower similarly inclined, but in Λ form, the point of ignition being the junction of the two points of the V's. The lower pair, moreover, is placed at right angles with the upper, so that seen in plan they would form a cross. They can, however, be placed in any other relative position without in any way interfering with the results. The carbons at present used are 18 inches long, and of varying diameters according to requirements. They are carried in fixed holders, so arranged that the points of one pair are always approaching towards those of the other pair. The carbons are kept in juxtaposition by means of a fine endless cord, on which is suspended a weight, the cord passing over a small pulley attached to each holder. It is so adjusted that every part is in equal balance or tension, and the descending weight draws the carbons together, following up their consumption in the most precise manner. The carbons are free to slide through their holders, either small friction pulleys or copper-wire brushes being used to facilitate their forward movement and to insure their exact position at all times. The pulleys also act as conductors of the electric current. The top holder is capable of adjustment, by means of a set screw, for increasing or diminishing the length of the Voltaic arc, according as there are a greater or a lesser number of lights in the circuit, several lights requiring, of course, a smaller arc—or, in other words, more closely-placed carbons than a single one.

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* Continued from page 460.

Having once determined and fixed the length of the Voltaic arc, the distance invariably remains the same until the carbons are consumed, unless anything occurs to interrupt the current. Should the current, however, be broken or interrupted from any cause, another beautiful arrangement comes into operation by means of which the light is instantly restored. Its continuity, indeed, can hardly be said to have been broken, so inappreciable is the time between the extinction and reappearane of the light. It is, in fact, a mere wink of the light. The lower carbon holder is itself a small electro magnet, which, while the current is flowing freely and uninterruptedly though to the carbon, is held up to an armature fixed over it at the opposite end to that at which the carbon is held. Intermediately between these two points the arm of the holder is pivoted to the framing of the apparatus, and the holder is capable of a slight play on this pivot similar to the motion of a scale beam. Upon the current being momentarily interrupted, contact between the rear end of the holder and the armature is broken, and the front end of the holder, with its carbons, is instantaneously drawn upwards by means of a small spiral spring, and the carbons making contact, the light is instantly re-established. This re-establishment of the current of course causes immediate contact between the electro-magnet and the armature, and the Voltaic arc is again fixed. By means of this ingenious and exceedingly simple self-acting arrangement, the light is made practically continuous, and the necessity for all complex clockwork arrangements entirely avoided. The currents are led from the wires up rods, the positive to the upper pair of carbons, and the negative to the lower pair. By having the positive current at the top and the negative at the bottom, the light is thrown downwards owing to the concavity of the burning surface of the upper carbon point. By reversing the currents there is a reverse result, the light being thrown upwards. The change of carbons is effected without in any way interfering with the continuity of the light. It will be remembered that four carbons are used, so that by withdrawing one at a time when nearly consumed, and replacing each by a fresh one, no interruption whatever is caused in the illumination. Another point gained by the use of four carbons in the moderator system, as against two in ordinary, is the production of a continuous light for double the length of time any other system will give, without change of carbons, the carbons being, of course, of the same dimensions in each case. The light from the carbons is transmitted through opal-tinted glass globes, and a steady, bright, but not by any means intensely brilliant light is diffused around. There is also an absence of those dense black shadows so generally caused by the electric light. In short, a useful and agreeable light, which can be moderated to suit all circumstances, is produced.

It will thus be seen that, so far as the science of electricity combined with that of mechanics will at present permit, we have here a very perfect system of electrical lighting. Upon the occasion of our visit to the works the workshop was well illuminated by one light, and the adjoining office by another. Two more lights were added to the series during our visit, making four in all, and showing the perfect subdivision of the current. The current was produced by one of the smallest Gramme machines, by which the number of lights was consequently limited; with a larger machine the number could have been increased. Individual lights were extinguished and re-ignited without in any way interfering with the others in the series. In short, all we have stated as capable of being effected with the moderator light was clearly demonstrated. To sum up its advantages, we may observe that it possesses simplicity of construction, which means economy in first cost, while it is stated that the economy of working will be very great over other systems. The lighting point is absolutely fixed, and perfect divisibily of light is attained in conjunction with absolute continuity. There is no limit within reason to the length of the carbons, and they are easily removed and replaced without interruption to the light, so that the moderator will practically burn for an unlimited period and with perfect steadiness.

Such is the most recent phase of the important question of electrical illumination which has been been brought into its present practical condition by M. Rapieft. Its development, however, is being effected under the immediate auspices of Mr. E. J. Reed, C.B., M.P., who some years since made a very complete study of electricity and electric lighting. Having become acquainted with M. Rapieff's inventions in this direction, Mr. Reed made arrangements with him to put them into practical shape. This has been done under the detailed management of Mr. R. Applegarth, whose name is not unknown in connection with the subject of electrical lighting. Now that exhaustive experiments have established the practical value of the moderator light, it is Mr. Reed's intention to take steps for establishing this system of electric lighting in this country. It is, therefore, probable that before long the public will have an opportunity afforded them of passing an opinion upon the merits of an invention which, so far, holds out very great promise of being a scientific as well as a practical success.

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REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

The author proceeds to treat of the action of light upon chromo-gelatine. A mixture of potassium bichromate of gelatine behaves differently under the influence of light according as it is in the form of a watery solution, or in a dry state. In the former condition, after being exposed some days to the light, it turns gradually of a brown colour; but the action is very slow, and no gas is given off. Light acts very slowly also on a chromo-gelatine that has set, though in this condition it is much more sensitive. Even

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when the action of light has commenced, it is a long time before it becomes visible.

Take a glass plate, coat it with chromo-gelatine, and allow the latter to set; after it has been exposed for an hour or more to sunlight, the parts that have been acted on by light will be found to be insoluble in warm water; but a longer exposure will turn the mixture brown, and will increase the insolubility. A dried chromo-gelatine browns much more rapidly; a few minutes' exposure to ordinary daylight is enough to turn it brown, and a longer exposure makes it quite black. Chromo-gelatine that has been exposed, after being digested in water of from 15° to 20° C., gives up a large quantity of undecomposed potassium bichromate; after a short exposure, and under long continued soaking, it swells up gradually, and becomes nearly colourless; with a longer exposure it will no longer swell up in cold water, and will remain of a brownish colour. Hot water dissolves only the undecomposed gelatine, but causes the portion that has been acted on by light to swell up to a certain extent, and partially dissolves it. A very long exposure renders chromo-gelatine insensible to either hot or cold water.

The duration of the exposure for producing a photographic image varies with the nature and object of the method adopted. But, as a general rule, it may be accepted that the more chromate contained in the gelatine the more rapid will be the action of light. A film of chromo-gelatine containing 10 per cent. of chromate must be exposed twice as long as one containing 30 per cent. to produce the same effect. Carbon tissue behaves in the same way; according to the author's experience a tissue sensitized with a 2 per cent. solution of potassium bichromate took twice as long to expose as one prepared with a 4 per cent. solution.

Fontaine was the first to point out the great sensitiveness of a mixture of potassium bichromate and an organic substance, as compared with that of paper prepared with silver chloride. Some authorities have exaggerated ideas of the sensibility of chromo-gelatine when dried; but, at any rate, carbon paper sensitized with potassium bichromate is quite as sensitive to light as chloride of silver paper, and generally the latter requires three times as long an exposure as the former. Boivin proposes to make use of the greater sensitiveness of carbon paper as compared with silver chloride paper, to determine the length of time required for copying carbon prints where a photometer is not at hand; and in general all writers on the subject agree in confirming the greater sensitiveness of the bichromate, though, on the degree of difference, the quality of the paper that is used must have a considerable influence. It must also be noted that the amount of colouring matter contained in the gelatine has a great influence on the sensitiveness; a paper containing only a small quantity of pigment requires double the exposure of one that is rich in colouring material.

The time of exposure of chromo-gelatine will of course vary according as it takes place in the sun, or in the shade. According to the experiments of the author, collotype plates required four times the length of exposure in the shade that they did in sunshine; this was on a cloudless day in June, but in November the time of exposure in the sun was about a half of that necessary in the shade. In general, photographers are agreed that it is best to expose in the shade for from three to four times as long as in the sun. To confirm his experiments, the author compared his results with Holetchek's intensity tables, in which are recorded the chemical intensity of light throughout the year, and which are drawn up from Vienna and all places in the same latitude. From these tables we find that at noon in June the duration of exposure in the sun, one-fourth of that in the shade, and at eight o'clock in the morning, or four o'clock in the afternoon, one half; in January at noon, the exposure in the sun is rather more than one half of, and at ten o'clock in the morning, or two o'clock in the afternoon, nearly as long as, the exposure in the shade.

With regard to the electric light the author remarks that its actinic effect is about one-fourth of that of sunlight; a light produced by from forty to fifty large Bunsen's elements is four or five times less than that of the unclouded sun. Rodrigues, at Lisbon, makes large use of chromo-gelatine exposed before the electric light in photo-lithography and heliography; in Vienna Winter uses it for enlargements, and Vanderweyde for portrait photography. For these purposes Gramme's or Siemen's electro-magnetic machine is especially suitable. The magnesium light is much weaker; according to Bunsen's observations, the photo-chemical intensity of a light produced by burning one decigram of magnesium per minute is only $\frac{1}{36}$th of that of sunlight. The magnesium light has been used in enlarging photographs with an exposure of two minutes.

The above remarks on the difference of the times of exposure in direct sunlight and in diffused daylight have nothing in common with the phenomena that copying on carbon paper takes comparatively longer in the sun than in the shade. Probably the latter is analogous to the fact that with a thin negative, in silver printing, purer and harder copies are obtained in the sun, but when copied by diffused light they show less strong contrasts. It appears as if, with a film which is hard to penetrate, the same quantity of light, so to speak, produces a greater effect when acting slowly and gradually than when it acts in a more rapid and concentrated manner. Perhaps also the so-called after-action of the exposure may have something to do with it.

In the subsequent chapter of his treatise the author deals with the water contained in chromo-gelatine in relation to its influence on the sensitiveness of that substance.

It has already been explained that the sensitiveness of moist chromo-gelatine is much smaller than that of the dry; but it must be recollected that air-dried gelatine films still contain 17 per cent. of water. The impression is very general that carefully-dried chromo-gelatine is more sensitive than the less dry variety, and it is quite true that carbon paper is more sensitive twenty-fours hours than it is ten or twelve hours after sensitizing, and, indeed, that it is mostsensitive the third or fourth day after. These phenomena are somewhat complex; but the explanation lies in the fact that the film has commenced to become insoluble, and this has to be taken into consideration. On this point the following experiments are described at full length.

Carbon paper was sensitized in a 3 per cent. bichromate solution, and dried in the air, and in the dark for twelve hours. It was then divided into three parts, of which the first was placed in a drying box over calcium chloride; the second in a box the bottom of which was covered with water; and the third was left in the air. In this condition they were left for thirty-six hours, and at the end of that time—that is to say, two days after their preparation—they were exposed under a photometer of fine tissue paper. The result was very striking. The paper that had been kept in the box wherein the air was saturated with water-vapour showed one degree of the photometer more than that dried in the air, and the paper dried over calcium chloride was less sensitive than that dried in air, though by not quite so much as a degree of the photometer. Portions of the same papers sensitized successively, day by day, to exposure and development only, confirmed these results. On the fifth day the air-dried paper had copied up to the eighth degree of the photometer; that kept over calcium chloride had reached only the sixth degree; while that left in the box over water attained the ninth degree. But as regards solubility, also, decided differences manifested themselves. The carbon paper dried in the air, and over calcium chloride, was completely developed with warm water of 30° C.; but the paper that had been kept moist could only be developed with water of from 50° to 60° C., and at this temperature (all these preofs were supported on a glass plate) the two others had gone back, so that they showed only four and six degrees of the photometer. The paper from the calcicm chloride drying box remained the most soluble, so that the disposition to become soluble had made its appearance, to a slight degree, in the sample that had been kept most moist, and not at all in the driest.

In order to be able to estimate the influence of this potentiality of producing incipient insolubility on the sensitiveness of chromo-gelatine, the author on the sixth day undertook a further series of experiments. He placed (1) carbon paper that had been kept for five days in calcium chloride in the box filled with water; (2) another piece of the same paper he exposed to the air; (3) a third piece he allowed to remain over the calcium chloride; (4) he laid a piece of air-dried paper over water; (5) same over calcium chloride; (6) the same he left exposed to the air; (7) paper from the water-saturated atmosphere was left therein; (8) the same was hung up in the air; (9) the same was placed over calcium chloride. The next day all these papers were exposed at the same time, under the same photometer, and developed; it was then seen that 7 had reached the thirteenth degree; 8, the twelfth; 9, the tenth; 5, the seventh; 2 and 3, the fourth; 1, the fifth; and 8, the fifth to sixth. As regards insolubility, 7, 8, and 9 were most insoluble; next in order came 4, and the others were all quickly soluble. On the seventh day the experiments were concluded, because the papers that were most moist had lost their solubility to such a degree as to prevent them from being properly developed.

From these observations it must be inferred that chromo-gelatine is most sensitive when it has been kept for some time in an atmosphere saturated with moisture, and, on the contrary, least sensitive when it has remained in perfectly dry air. In the dark room, where the pigment paper was deposited, the dry-bulb thermometer registered on an average during the experiments 17° C., and the wet-bulb 13° C.; this corresponds to a 61 per cent. proportion of water-vapour in the air of the room, and to a vapour pressure of 14·4 m.m.; the temperature of the room, which was kept well closed, did not vary in either direction more than 5° C.

The conclusion arrived at by the author is, therefore, quite contrary to the prevailing opinion, that the drier chromo-gelatine is, the more sensitive it becomes; it must, however, be noted that to obtain the same results with his experiments requires careful manipulation. Chromo-gelatine more or less soaked full of water is much less sensitive than what in the common acceptation of the term are called "dry" films. The amount of moisture contained in the gelatine must therefore not be too large, but only such as is absorbed from water vapour at the ordinary temperatures.

Here we have the following simple but practical and important rule: Keep your sensitized chromo-gelatine in as dry a place as possible, where it will remain unaltered for a long time; but before exposing, place it in a damp atmosphere (over a vessel containing water, or in a cellar), by which means it will be made more sensitive. Treated in this way, carbon papers acquire great flexibility by taking up moisture, and can be conveniently handled, without giving cause to fear that they will adhere to the negative. Care must in every case be taken not to raise the temperature too high, or the gelatine will become sticky.

(*To be continued.*)

ADULTERATION OF LUNAR CAUSTIC.[*]

A PARCEL of lunar caustic having been lately received from a French manufacturing house, its appearance at once excited suspicion, for its surface was like that of biscuit porcelain, and it was very difficult to break. As regards whiteness it left nothing to be desired, but when broken there were on the section none of those well-known radial lines which are peculiar to fused silver nitrate.

The substance was therefore submitted to test, and for this purpose one grain of the doubtful caustic was mixed with one grain of distilled water, and carefully dissolved at a gentle heat in a test tube. When cold, 6 c.c. of rectified alcohol of 34° Baumé were added, which immediately produced a white flocculent precipitate. After it had been allowed to rest for twenty-four hours, the precipitate had completely subsided, and had assumed the form of long acicular crystals. These crystals were well washed with alcohol on a small filter, and then ignited on a piece of platinum foil; the residue, moistened with distilled water. turned turmeric paper brown, and further reactions left no doubt that the needle-shaped crystals consisted of saltpetre.

Now, in such a case, the direct termination of the potassic nitrate is more tedious and less accurate than the indirect method; besides which, the amount of silver contained in the caustic is the principal consideration. Under these circumstances a gram of the solution of the caustic to be analysed was taken, and the silver it contained was deposited on a piece of clean sheet copper, which, after being dried, was weighed. The result showed that the silver in the caustic amounted to 57·20 per cent, whereas the proper proportion should have been 65·35 per cent. Now since 57·20 parts of metallic silver give only 90·03 parts of silver nitrate, it follows that the sample of caustic that had been submitted to analysis had been adulterated with 9·97 per cent., or, roughly speaking, nearly ten per cent., of potassic nitrate, a deterioration in value that with the present high price of caustic is of great consequence. It must not be assumed that the manufacturers had purposely adulterated it with ten per cent. of saltpetre.

Probably, owing to a mistake, impure caustic was sent instead of pure; the inferior quality is kept for the use of surgeons, who employ it as a caustic, for which purpose it is better adapted than the better sort, as it is less brittle. The mistake, however, is of great consequence to photographers; no one would like to have his solutions of less strength than are prescribed by his formulæ, just as little as he is inclined to pay the price of caustic for saltpetre. In order to be quite sure, you must either take the trouble of analysing the caustic, or, what is better, you must at once use the doubly crystallized silver nitrate. This salt is not liable to the adulteration mentioned, as it and potassic nitrate will not crystallize together.

A GOOD DRY PLATE DEVELOPER.

M. QUEVAL gives the following in the *Bulletin Belge* as a good dry plate developer, free from many defects often experienced:—

"When a dry plate is coated with a preservative principally or entirely consisting of gallic acid, it can be rapidly developed by the following solution:—

Distilled water	100 c.c.
Crystallized silver nitrate ...	4 grammes
Acetic acid	4 „

Place the plate, film downwards, in a trough of rain water, so as to moisten the whole of the film without unequally removing the preservative; then pour all over it the above solution; the picture will quickly appear, and will generally be completely developed. It must be carefully watched, and washed when sufficiently intense.

"All photographers who are in the habit of developing dry plates have observed that when too much silver nitrate has been added to the developer, the intense blacks of the negatives were riddled with small holes. The formula which I have given above does not produce this result, even though the proportion of nitrate be much larger.

"I have only tried this developer with stereoscopic positives on albumen or albumenized collodion, and I am bound to add that I have obtained very unequal results I therefore introduce it to public notice with some hesitation, though I believe that by washing off the preservative and by modifying the proportion of the ingredients, a very rapid and energetic development will be obtained."

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[*] *Photographisches Wochenblatt.*

The Photographic News.

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SOCIETY OF ARTS EXAMINATIONS IN PHOTOGRAPHY.

Some further information regarding the proposed examinations in photography under the auspices of the Society of Arts will be interesting to many of our readers. Our extracts are made from the Programme issued by the Society of Arts, copies of which can be obtained from the Society at its offices, John Street, Adelphi, W.C., or of Messrs. Bell and Sons, the publishers, York Street, Covent Garden. Intending competitors will do wisely to obtain the complete Programme, and so secure full information. We need scarcely point out to readers that passing a successful examination before such a tribunal is somewhat akin, if not precisely equivalent, to passing a similar ordeal before the authorities of a photographic college, which so many of our readers have ardently desired an opportunity of doing. Primarily, as will be well understood, these examinations in various branches of culture were established for students associated with the Society of Arts, either directly, or as members of institutions in union with the Society; but arrangements have been made whereby other students are also admitted. We append some of the published conditions:—

"1. These Examinations are specially intended for the benefit of members of Institutions in Union with the Society of Arts, but other persons are admitted on certain conditions, specified below, though they cannot compete for prizes.

"2. The Examinations are held in all places of the United Kingdom where a Local Examination Board, connected with the Society of Arts, is willing to make the necessary arrangements.

"3. Local Boards can become connected with the Society of Arts through an Institution in Union with the Society, or by an annual payment of one guinea.

"4. Each Local Board must consist of at least three members, and must have a Chairman and a Secretary. The district for which the Board is to act should be clearly defined, and the composition of the Board must be such as to command the respect and the confidence of the neighbourhood. No member or officer of a Local Board can be admitted to examination.

"5. The duties of the Local Board may be defined as follows:—

"(*A.*) To give publicity to the system of Examinations, by the circulation of the programmes, posters, &c. (copies of these will be furnished *gratis* on application), and to give encouragement and advice to those young persons who are likely to become candidates.

"(*B.*) To superintend the Examinations.

"6. A list of each Local Board (giving the exact address of the Secretary) should be submitted to the Council of the Society of Arts before the 1st of January, 1879.

"7. For a list of Local Board already formed, see pages 3 and 4. Anyone desiring to be examined should apply to the Secretary of a Local Board.

"8. Every candidate must be at least 14 years of age.

"9. (*A.*) Members of Institutions in Union with the Society of Arts are examined free.

(*B.*) Persons who are not Members of Institutions in Union with the Society may be examined for certificates on payment of a fee of 2s. 6d.

"But cannot compete for prizes.

"10. Candidates who are, or have been, professional teachers or pupil-teachers cannot compete for prizes.

"11. A copy of Form No. 2 (return of number of candidates) will be forwarded to the Secretary of each Local Board in February, and must be filled up and returned to the Secretary of the Society of Arts not later than the 8th of March, 1879. The requisite number of Forms No. 4 (candidate's return) will then be forwarded, and these, when filled up, must be returned not later than the 29th of March. Each of these forms, when returned, will be numbered at the office of the Society of Arts, and a card for each candidate, with his name and his number, will be forwarded, on the 4th April, to the Secretary of the Local Board for distribution, together with copies of the Time-table.

"12. The printed papers of questions in the various subjects will be afterwards forwarded on the 18th April, to the Secretary of the Local Board; details as to the mode in which the Examination is to be conducted are contained in the Letter of Instructions (Form No. 6), which is forwarded with the papers of questions, and members of the Local Boards should make themselves thoroughly acquainted with them.

"13. The subjects for Examination are as follows:—(1) Arithmetic, (2) English Composition and Correspondence, and Precis Writing, (3) Book-keeping, (4) Commercial Geography and History, (5) Shorthand, (6) Political Economy, (7) French, (8) German, (9) Italian, (10) Spanish.

"14. In order to obtain a 'Certificate in Commercial Knowledge,' a candidate *must pass* in three subjects at least, two of which must be arithmetic and English. Candidates who pass in one or more subjects, but who do not obtain such a certificate, will receive single certificates, which will count towards the certificate in Commercial Knowledge.

"15. The subjects may be taken up in one year (so far as is allowed by the Time-table) or in successive years, and the class (First or Second) obtained in each will be recorded on the certificate. There will be no Third-class. The results of the examination will be published with the *Journal of the Society of Arts.*

"16. A candidate who, having passed in three or more subjects, has obtained a certificate in Commercial Knowledge, may come up for examination from time to time in any of the other subjects, and, if successful, should, as soon as the results are published, hand in his certificate to the Secretary of the Local Board, who will forward it to the Society of Arts for the necessary additions.

"17. A candidate who has obtained a First-class in a subject may be again examined in that subject with a view to a prize; but not more than one First-class in any subject will be counted for the Prince Consort's Prize, or for the Council Prize to Females.

"18. Candidates who have obtained, under the former system of Examinations, First or Second-classes in Arithmetic, Book-keeping, Commercial Geography and History, or in Political Economy, or First-classes in Commercial French, or in Commercial German, will be credited with these classes in the Commercial Examinations.

"19. The Examiners will reject all ill-written, ill-spelt, ill-composed, or ungrammatical papers that may be laid before them.

Referring specially to examinations in Technology of the Arts, the following conditions are given:—

"1. In order to pass these examinations it is essential that the candidate (who must be actually engaged in the special branch of industry in which he desires to be examined) should possess, in the first place, such an elementary knowledge, at least, of abstract science, as will enable him thoroughly to understand the scientific principles of which his art or manufacture is an application; and, in the second place, such a knowledge of the application of those principles in his trade as will show that he is practically conversant with the various processes and manipulations of the factory or workshop. The theoretical knowledge must not be a mere 'cram' of empirical dicta; nor the practical knowledge a mere committal to memory of descriptions of manufactures picked up from text-books.

“2. The examination in each industry may therefore be considered in three parts.

“3. The first part includes those branches of science a knowledge of which is requisite as a foundation for sound technical instruction in that particular industry.

“4. The second part relates to the technology of the manufacture, or the special application of the various branches of science to it.

“5. The third part relates to the practical skill in the manufacture itself.

“6. The candidate’s knowledge of general science will be tested by the May Examinations of the Science and Art Department. The examination in Technology will be by a special examination paper, to be worked in conjunction with these examinations. The practical skill will be judged by the returns of the candidate’s employment, for some time past, in the particular art or manufacture.

“7. In those branches of industry in which Freehand and Mechanical Drawing, Painting, and Designing for Manufactures are required, the candidate’s power will be tested by the Examinations of the Science and Art Department.

“8. On the result of the combined examinations the Society of Arts will award certificates. These certificates will be of three grades, according to the proficiency of the candidate :– (1) The elementary grade, (2) the advanced grade, (3) honours. Each grade will further be subdivided into two classes—First and Second-class. A candidate who has obtained an Elementary or Advanced Certificate may be again examined for one of a higher grade in a future year.

“9. For the particulars and date of the Examinations of the Science and Art Department, the candidate is referred to the Science Directory and Time-table issued by that Department. These may be obtained on application to the Secretary, Science and Art Department, South Kensington, London, S.W.

“10. The examination in Technology will be held, in 1879, on the evening fixed for Nautical Astronomy, by the Science and Art Department. (See Science Directory).

“11. Candidates must make their arrangements for examination at the different local centres with the secretaries of the local committees, either those organized in connection with the Society of Arts, or with the Science and Art Department (see pages 3 and 4 of this pamphlet, and the list in the Science and Art Directory). The secretaries of Local Committees willing to hold the examination, and having candidates for examination, should apply, early in the month of March, 1879, to the Secretary of the Society of Arts, Adelphi, London, W.C., stating the number of candidates desirous of being examined, when a corresponding number of forms (A.) will be forwarded to be filled in by the candidates and their employers. These must be returned not later than the 31st of March, after which no forms will be received.

“12. As soon as the results of the Science and Art Examination are published, a number of forms (B.) corresponding with that of the candidates who have been examined in Technology will be forwarded to each centre of examination, and the Local Secretary should see that each candidate fills in a form showing the highest successes he has gained in the Science Examinations in the subjects in which it is necessary to pass in order to obtain a certificate in Technology. These forms should then be verified by the Local Secretary, and returned to the Society of Arts.

In connection with the technology of photography, the following are the details :—

“Part II.—Technology.

“5. The characteristic properties of pyroxyline for the manufacture of collodion and the various substances employed for the purpose, as well as the solvents—such as ether, alcohol, wood naphtha, &c. Different qualities of collodion.

“6. The various processes, both wet and dry, including the Daguerreotype; and the principles involved in each. Emulsions, both with collodion and gelatine, paper processes, developers, acid and alkaline, intensifiers, &c.

“7. Processes for portrait work, landscape work, copying pictures, maps, engravings, and documents of all kinds. Printing in silver, and other metals, in carbon, Woodburytype, vitrified enamels; toning and fixing.

“8. Special applications of photography to engraving, typography, photo-lithography, including the various processes for colletype, &c.

“9. Special applications of photography to astronomical and microscopical purposes, as well as for recording meteorological and other observations.

“10. Lenses, and the various purposes for which they are specially adapted. The construction of cameras, and other apparatus, &c.”

“Part III.—Practical Knowledge.

“11. The candidate must forward to the Society of Arts a certificate, on a form supplied (see par. xi.), certified by his employer, stating the nature of his employment in a photographic establishment, and showing that he is practically conversant with at least one branch of the art. He may also be required to send specimens of his work.”

PHOTOGRAPHIC CHARACTER OF VISION.

It will be remembered that in the course of last year a discovery was made which gave to vision the character of a photographic operation, reversing the previously held theory on the subject. A Continental *savant*, Dr. Boll, threw some new light on the structure of the retina by the discovery of a substance of purple colour in the last retinal layer, in which a portion of the “rods” is engaged. It had escaped notice before, because of its very rapid disappearance on the action of light. Dr. Boll felt himself warranted in saying that the formation of images on the retina was a veritable photography. Subsequently Dr. Kühne discovered the organ by which this purple is incessantly reproduced—viz., the mosaic layer, or the xagonal epithelium of the choroid, which, therefore, it has been proposed to call the retinal epithelium. M. Giraud Teulon, in a recent report, calls attention to some modifications in theory required by the unlooked-for physiological function referred to. Thus, as regards the persistence of positive images (*i.e.*, the continuance of the sensation after the impression that produced it), the simple fact of chemical decolouration of the retinal purple by the light, involving a certain time for its reconstitution, by the secreting action of the mosaic layer, gives a sufficient account of the phenomenon. Then, as to accidental negatives and their successive phases of colouration, the photo-chemical theory replaces Young’s perfectly arbitrary explanation, based on three supposed different kinds of fibres, by a simpler one, which is this :—A given monochromatic light chemically alters, in a constant and uniform way, the retinal purple which it encounters. Now, the rod, or primitive nerve-element, has its base immersed in the bath formed of this substance. We have only, then, to suppose in this element the power of feeling, in a different way, the intimate contact of different media, exactly as the *papillæ* of the nerves of special sensibility (like those of smell and taste, for example) appreciate or carry to the sensorium stimulations as varied as is the nature of the liquids or effluvia which come to them. When the primary cause, the luminous object, is withdrawn, the nerve-fibre, according to the progress of the reconstitution of the purple, announces by successive testimonies the gradual renewal of the normal bath.

ENGLISH ART IN FRANCE.

An impression prevails in the minds of many young art students that in England art is in a lower state than in Continental countries, and that photography in England is less artistic, because less art culture, and less facilities for art culture, generally prevail at home, than abroad. Such a notion is as unwholesome as it is untrue. We make some extracts from a review of the art in the present International Exhibition in Paris, by Mons. Duranty, especially estimating the English art contributed, an abstract of which appeared in the *Times*.

"The English contribution of paintings in 1855, was," he says, "second in numbers only to the French, and came upon the Continental visitors to the Exhibition as a surprise. It was even more than a surprise, it was a revelation—a revelation of a school whose existence was not even suspected, and English painters, but little esteemed till then, obtained a very great success. The school of water-colours was new not only to Europe, but to art, and the French were quick to see of what the new method was capable.

"In 1878 the English contribution is very large, and marks, in the opinion of the critic, a very important advance. He traces the origin of the English school to Holland, an origin of parentage, but not of imitation. The same houses, the same sky, the same manners, the same maritime life, the same religious tendencies are found in England and the Netherlands. Since 1855 the influence of French and Italian art has produced its effect, though the national character of the school is little altered. Through all the differences of schools and tendencies the English eye has remained the same. The school of Mr. Ruskin and the pre-Raphaelites is, he thinks, on the wane. Mr. Millais especially, by the force of his artistic intuitions, and influenced somewhat by Baron Leys and M. Jules Breton, has been able to emancipate himself from most of the fetters which trammelled him in his earlier career. Minute pre-Raphaelism has disappeared, but the bold and vigorous hand, the penetrating eye of 1855, are more vigorous and penetrating in 1878. The variety of his work is splendid, ranging from exact minuteness to the greatest effects, and is suffused with the magic of the most dreamy and pensive charm. Millais is one of the men of the art of the nineteenth century. With the usual French readiness to generalize, M. Duranty sums up the characters of the various continental and insular schools in two paragraphs. German painting, he says, is sober, restrained, reflective, grave, sometimes profound, sometimes smiling; but it seems to bear the weight of a grey sky and to reflect the cares of a laborious life on a hard and ungrateful soil. Russian art has a *bizarre* and local flavour. Denmark is provincial. Sweden is French. Norway is German. Holland is English, without English distinction. Belgium art is material. Southern Germany bursts forth into an explosion of colour which has the tone of copper, a noisy *fanfare* sounded to attract attention. In Switzerland and in Greece, as in the small States of the north, art draws its inspiration either from France or Germany. Italy ferments, but from the confusion will flow a clear and pleasant stream. Spain and Italy are alike. Above all towers English art, original, delicate, scrupulously true, expressive, full of a lofty intellectual 'dandyism,' full of sensitiveness, grace, and refined tenderness, full of historical sentiment which joins modern things to the lofty accents and strong attractions of the past; an art of penetration, elegance, and poetry, absolutely bound up with the genius of the nation; an art in which melancholy is joined to pleasure, and singularity to precise reality. Throughout Europe there is one tendency stronger than the rest. The modern world is painted. We turn our backs upon nymphs and fauns, and we march with that powerful movement which draws the spirit of our times to precision, observation, science, to the study of nature and of actual life, and which thinks that this modern world is worthy of celebrating itself of and of transmitting to posterity its own exact likeness. Though the followers of tradition go into mourning and have many legitimate regrets, they must, nevertheless, become resigned to facts. The movement is not in their hands, and if France attempted with them to struggle against the current, it might very well happen that she would awake one of these days and find that she was weak and behind the time."

STUDIO GLUE.

BY NELSON K. CHERRILL.

Every one knows what a nuisance it is to "heat the glue pot" when some small mend has to be made. And most people also know that all substitutes for glue are more or less failures for wood work of all kinds; and, indeed, for most kinds of soft substances there is no cement that is so thoroughly satisfactory as glue. I have found an exceedingly simple way of using glue for small mends, and for general purposes where but a little is wanted at a time. The simplicity of the matter is so great as almost to need an apology for mentioning it, but its utility is so great that I must make *that* my excuse for writing about it. This is the method:—Put a pinch of Nelson's shredded gelatine into a wide-mouth bottle; put on it a very little water, and about one-fourth part of glacial acetic acid; put in a well-fitting cork. If the right quantity of water and acid be put, the gelatine will swell up into worm-like pieces, quite elastic, but, at the same time, firm enough to be handled comfortably. The acid will make the preparation "keep" indefinitely. When required for use, take a small fragment of the swelled gelatine, and warm the end of it in the flame of a match or candle; it will immediately "run" into a fine clear glue, which can be applied at once direct to the article to be mended. The thing is done in half a minute, and is, moreover, done well, for the gelatine so treated makes the very best and finest glue that can be had.

I have no doubt this plan might be modified by dissolving a trace of chrome alum in the water used for moistening the gelatine, in which case, no doubt, the glue would become insoluble when set. I have not tried this, as, for general purposes, there is no need for subsequent insolubility in glue.

NOTES OF A SKETCHING AND CAMERA TRIP TO SCOTLAND.

BY REUBEN MITCHELL.

Having obtained a twenty-eight days' return ticket to Edinburgh, I left Bolton for Carstairs, having decided to go to Lanark, where I arrived safely about six o'clock p.m., and took up my quarters at the Clydesdale Hotel, a comfortable and convenient place to stay at, and refreshed the inner man.

I started for the Falls at once, to enable me to arrange my operations for the following day. I had provided myself with a ticket, as the Falls are in private grounds, with gates and keeper to each, all very civil and obliging. The distance is about 2½ miles from Lanark. Shades of evening were fast approaching when I arrived at the first Falls, Cora Linn; the stillness of the surroundings, with the wooded glen and overhanging trees, made the grand sublime scene before me very impressive. This lovely spot must be seen to be appreciated. It is a marvellously picturesque Fall, making three leaps of about 84 feet, the water leaping down from rock to rock, causing the spray to fly about in all sorts of fantastic forms, rushing on to the next lower Fall, to renew the same graceful gambols over again. There are notices fixed on the trunks of the trees to direct the course of the visitors from one Fall to the another. By this means I easily found my way through the thickly-wooded glen to the uppermost Fall, Bonnington Linn, very different from the other, but equally grand, the water leaping first on the shelf of rocks, spreading the stream into a number of fan-like forms, which fall about thirty feet into a deep basin below, and rush on to the next Fall through a rough bed of rocks very picturesque.

The lateness of the hour caused me to beat a retreat much earlier than I could have wished; such grand scenes of natural beauty are most attractive to the lovers of nature and art. Emerging from the wooded glen into the open ground at a considerable elevation above the Clyde, a most enchanting scene opened to my view—a large pool on the Clyde below, embowered in trees in the still gloom of approaching darkness, with the reflections of the objects around it in its mirror-like surface. On one side there still lingered a last soft ray of golden light. "How beautiful!" I exclaimed. "If this enchanting scene returns to-morrow evening I shall make a sketch in oil colours." I was so delighted with all that I had seen that I lingered on the way till it was quite dark when I passed through the last lodge gate. One feature worth noticing here, is, that several cotton mills have been erected and worked by water power. The village is called New Lanark, and supplies work-people for the mills. Both village and mills are in a deep glen, difficult of access both in and out.

The following morning being fine, after breakfast I started for the Falls again, having a conveyance; also provided with lunch, as I intended to make the whole day away at the Falls. Carriages and other conveyances are only allowed to proceed as far as the second gateway on the Lanark side of the river. I was soon on the spot selected, and set to work in earnest, and had the pleasure of being by myself all day, with the exception of one group of three visitors. As soon as I had finished Cora Linn I resolved to go to the opposite side of the river, as the spectator can only look on instead of looking at. It takes about an hour to drive round to the opposite side, through a large park, well wooded with fir trees, so we started off. On arriving opposite the residence of a Mr. Crighton, my car-driver informed me that he could not proceed any further without permission, so I alighted at once, walked to the Hall, and met Mr. Crighton near the house. Informing him of my object, he very courteously accorded the permission I requested, so I returned to the car and we drove on close to the Falls. What a grand sight opened to my view! As time was fast wearing away I set to work immediately, and made an oil sketch of the grandest part of the Falls. The day having been fine, and as I expected the effect I had seen the day before would be again repeated, I ordered my carman to drive me back to the hotel for a hasty dinner about five o'clock, after which I again set out for the Cora Falls for the purpose of sketching my evening effect. On arriving at the spot my most sanguine expectations were realised, so I set to work and completed my sketch at dusk. Such grand scenes can never be erased from the memory of the lovers of nature.

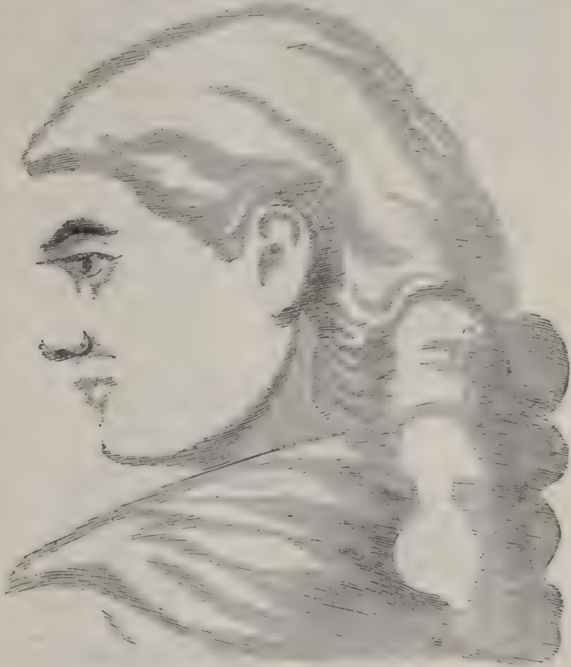
The next morning did not look at all favourable, but after breakfast I started for Stonebyers, the lowest Falls of the Clyde. Arriving at the entrance gate, the keeper was not in attendance, which caused some loss of time. The carman soon found him, when we were soon in view of the Falls. The points of view are rather distant and limited by the trees, which detracts from the grandeur. There is what is called Jacob's ladder, a mode of descent I had no inclination to attempt, it being slippery, difficult, and dangerous, so I had no alternative but to make a water-colour sketch from an opening in the trees, and the weather looking still more threatening I set to work at once. Long before I had completed it rained hard, but, determined to have a sketch, my carman held my umbrella over me. At last, all was so much wetted, I was obliged to be contented with what I had taken, and returned to the hotel, and after lunch decided to leave Lanark for Edinburgh. The day was a very wet one, so I paid my bill and took the train for Carstairs, where I had to change for Edinburgh, and arrived there about six o'clock.

As it was still wet on the following day, I left Edinburgh at three o'clock for Loch Earn Head, and arrived at the railway station about 7 30 p. m. A 'bus meets each train to convey visitors from the station to the Loch Earn Head Hotel, which is about two miles distant, and situated in a valley of great natural beauty, and conveniently near the Loch, a fine view of which is obtained from the front windows. The hotel is commodious and very comfortable, every attention being paid to the comfort of their visitors by the host and hostess, Mr. and Mrs. Dayton.

THE IMAGINATION IN THE ARTS.

The following suggestive and interesting article is from the *Scientific American*:—

"Without the imagination art would have no soul, and we would have nothing beyond the visible and tangible, nothing but the gross and ponderous. The accomplished artist, with a few skilful brush strokes, places shade here, and light there, until, to the unimaginative, there are only a few patches of colour which mean nothing, while in reality there are masses of light and shade which, to the artistic, are suggestive not only of the bolder elements of the picture, but also of detail which may be supplied by the imagination. In a really artistic picture there is no outline, no rigid delineation of any part, but everything pertaining to contour is soft and mellow, more suggestive than definitive, leaving much to be supplied by the creative faculties.



"The portrait, fig. 1, is composed of masses of light and shade; there are no rigid outlines, no arbitrary guides for

Fig. 2.

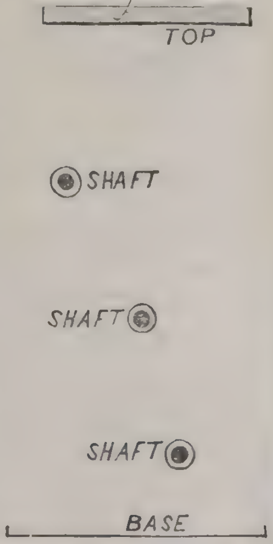
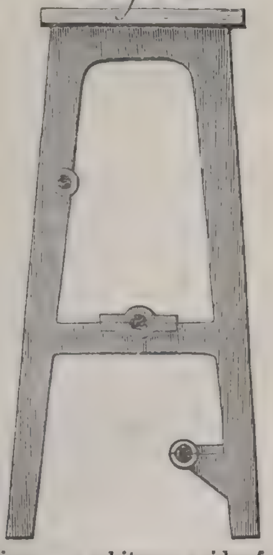


Fig. 3.



giving form or expression to the face, yet it has form and expression, for we imagine the lines that define the face. Each person has individual, natural, and peculiar tastes which govern the imagination, and thus control the characteristics of the picture, so that two persons cannot see in it the same face, but each sees a visage that is more or less beautiful according to the bent of his fancies.

"It is not in the fine arts alone that the imagination plays such an important part, for in the constructive arts this faculty is positively required. Elegance of design in architectural or engineering structures, or in machinery, is as essential as good materials or good workmanship. The builder who, through the exercise of his imaginative powers, plans and executes a beautiful structure, of necessity takes a leading position, and commands his proportion of patronage; and the machine manufacturer who mixes art with his iron has the long arm of the lever when compared with others who regard weight and strength as the only requisites. To illustrate this, we will take a machine in which certain points are necessarily fixed by the location of the shafts, the base, and the top. The inartistic and unimaginative would design a frame which, for practical purposes, might answer equally as well as any other, but it would not have that comely form which results from an artistic taste and an exercise of the imagination, and which goes a long way to make a machine popular.

Fig. 4.

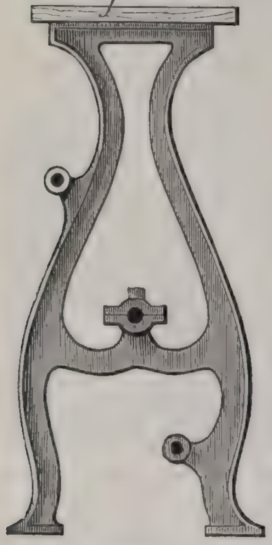
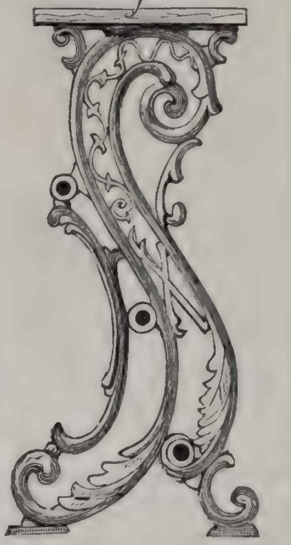


Fig. 5.



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YELLOW VARNISH FOR THE WINDOW OF THE DARK ROOM.*

Digest in a convenient glass flask (with a wide neck) 5 parts by weight of *xanthorhæa* gum (called also *acaroid* gum) with 5 parts by weight of alcohol of 95 per cent.; the flask must be set in a warm place for several days, and shaken up from time to time. Choose that kind of gum which in commerce has obtained the name of *black boy gum*, and has a dark colour.

When the alcohol has taken up all the gum that is soluble in it, add about a quarter part by weight of balsam of copaiba or castor oil, to prevent the varnish from tearing; the proportion of this latter ingredient may be increased if necessary. When flowed over glass plates the same as collodion, this varnish dries quickly, and leaves a transparent orange-coloured film, through which no trace of actinic light can pass; there is also the advantage that the glass plates cost scarcely any more than common window glass. A lighter colour may be obtained by diluting the varnish with spirit.

Varnish made in this way does not fade by exposure to light, so that in this respect it is to be preferred to every other yellow varnish. It can also be used by metal workers as a lacquer; for this purpose it can be laid on cold, and presents the advantage of being more brilliant and transparent than ordinary gold-lacquer. From the last-mentioned property *xanthorhæa*-gum varnish is especially well adapted for the use of the gilder, and for the restoration of old and worn-out gilt frames.

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Correspondence.

CYANIDE POISONING.

Dear Sir,—In the Photographic News for September 28 you mention that a correspondent has treated the subject of cyanide poisoning as a matter of fun, especially in the case of a small quantity of prussic acid destroying, or its capability of destroying, the whole of the persons assembled in the pit of a theatre. He says, How did the man escape that produced it? Evidently your correspondent has not the slightest knowledge of chemical manipulation.

I well remember, about fourteen years since, when distilling some prussic acid (at that time I made chemistry a great study) that while dsitillation was going on, a stray smell of prussic acid pervaded the room, so I very incautiously placed my nose near the apparatus, and suddenly caught a slight breath of the vapour. Instantly I fell back against the wall of the apartment, my teeth were clenched, and I fell to the ground, not quite unconscious, but powerless. Almost in an instant I appeared to be blind, and everything appeared to be dark, and a sharp tingling in the head, as though I were losing my mind. I had sense enough to crawl to the door-way; the door being open, I gradually recovered in about a minute. The whole affair did not last for more than two minutes; but I experienced a severe headache for the whole day. However, I managed to stop the leak in the apparatus, and complete the experiment, with a little more than I bargained for.

This was the effect of a trace of prussic acid vapour and air upon me. Therefore I can quite believe that if a small bottle of it were to be broken in the midst of a large assembly, that the outer ones only would have the chance of escape.

I think it is a stupid thing for persons to attempt to criticise, or poke fun at that of which they have not the slightest knowledge.—Yours truly, A. J. Jarman.

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Proceedings of Societies.

Photographic Society of France.

The ordinary monthly meeting of the Society was held on the 5th July, when M. Davanne, President of the Executive Council, occupied the chair.

M. Ruckhardt, Secretary of the Photographic Society of Vienna, and member for Austria of the International Jury of the Exhibition, was present at the meeting, and was invited by the President to take part in the proceedings.

The President announced to the Society the death of one of its oldest members, M. Fordos. The deceased was a Vice-President of the Chemical Society of Paris, and had rendered important services to photography. In conjunction with M. Gelis he was the inventor of a material known by the name of *Sel d'or de Fordos et Gelis* (double hyposulphite of gold and sodium), which was long used for gilding Daguerreotype plates.

M. Clement Sans, of Saurat (Ariege), read some notes on gelatino-bromide. He regretted that this process was not more in favour with photographers, which he attributed to the uncertainty of its results; for, if the plates have not been dried with sufficient rapidity, they are often covered with creases and bubbles. A remedy for this evil M. Sans finds in a peculiar method of polishing the glass plates, when the drying may without evil effect extend over two or three days. The plate, after being washed in water and wiped dry, is coated with suet, which is rubbed on with a cotton cloth; it is then damped all over with another piece of cotton dipped in alcohol. Before pouring on the gelatine, the plate is allowed to dry for one or two minutes, and any dust spots are removed with a camel-hair brush. A plate thus treated is not very bright; on the contrary, it has a decidedly spotty appearance, but the spots are harmless; the gelatine flows over it very easily, and the image develops without any bubbles. M. Sans works with Kennett's pellicule, to which he adds half the quantity of beer.

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* *Photographisches Wochenblatt.*

M. Lamy recommended the use of a substratum of ox-gall in carbon printing. His remarks have already appeared in our columns (see Photographic News of 6th Sept., p. 425).

M. Liebert observed that the process described by M. Lamy was not new; he also failed to see any advantage in using such an unsavoury substance as ox-gall, when ordinary yellow wax dissolved in benzine-collas would answer the same purpose.

M. Vidal presented to the Society a series of views of the International Exhibition printed by the phototype process. These prints were worked off on steam cylinder machines at the rate of 1,000 copies in nine working hours, a number which could easily be increased, if necessary, to 1,500 or 1,800 copies. In examining the prints, M. Vidal requested the members to bear in mind the difficulty of obtaining good negatives in the Exhibition Palace, where work could only be done before ten o'clock in the morning, and then among the dust and damp raised by watering the boards, &c.

M. Noe, in presenting to the Society some pictures taken with the panoramic apparatus of M. Mangin, Lieut-Colonel of Engineers, drew attention to the improvements that had been effected in the instrument since last it had been submitted to the notice of the members. More particularly, the field of view of the instrument had been extended in a vertical direction. The apparatus itself could be seen in the Exhibition; those to whom it was an object of interest would find it in Class XV., in the glass case of the *Depot des fortifications*.

M. Janssen, Member of the Institute, made a communication on photographic spectra taken by a short exposure. He exhibited to the meeting the spectra of various substances obtained on collodions sensitised with the principal iodides and bromides, either combined or separate. The point to which he especially directed attention was the fact that the shorter the duration of the exposure, the smaller is the extension of the spectrum, so that with an exposure of a few seconds or fractions of a second, as the case may be, the spectrum is reduced to a band near the G line of Fraunhofer. This was clearly shown by the photographs that he exhibited; they formed a series obtained with successively decreasing exposures, the effect produced being a series of rapidly diminishing spectra. This remarkable fact shows also, to some extent, how a short exposure allows us to obtain by photography more perfect images than those seen by the eye with the aid of astronomical instruments. M. Janssen also pointed out that his researches had been carried on with the 5-inch photographic objective constructed for him, according to his own directions, by M. Pramowski, at the time of his expedition to Japan in 1874. In the construction of this instrument the maker had made special allowance for this phenomenon of the spectrum, which M. Janssen had already at that time brought to his notice.

Berlin Association for the Promotion of Photography.

Meeting of the 5th July, Professor H. Vogel in the chair.

The President informed the meeting that Mr. Seavey, of New York, had visited Berlin, and had left with him a photographic portrait of his daughter taken by M. Klary, at Paris, by the instantaneous process of M. Boissonnas. As Mr. Seavey assured him, the exposure lasted only one second, and the objective used was a Dallmeyer 3B. The picture is very fairly finished, but the lighting rather rough and unartistic; it gives the impression of having been taken in a perfectly open studio without the use of curtains or screens.

Herr Schaarwachter was convinced that he could in a favourable light produce an equally good picture with an exposure of one second.

Herr Quidde remarked that as M. Klary must often be compelled to work in an unfavourable light, the success of his extraordinarily rapid exposure must be due to the chemicals that he uses. At the same time, the light in Paris would probably, in consequence of its situation further south, be better than that in Berlin, and working in an open studio must necessarily contribute to shorten the exposure, though, as in the case in point, it by no means adds to the beauty of the picture.

Dr. Vogel observed that it was easy to take photographs with an exceedingly short exposure, by working with fresh iodide of ammonium collodion, a very slightly acidulated silver-bath, and a moderately strong developer; but that a collodion of that description would lose its sensitiveness in the course of a few days; the silver bath also would soon deteriorate, and, in short, it would be impossible to obtain good results with the same materials for any length of time. According to accounts from America, Klary's collodion, silver-bath, and developer could be purchased there, but their sensitiveness was liable to fail very soon.

Dr. Richard, of Mennedorf, in Switzerland, recommends the use of potassium sulphide for intensifying. The objection to its employment is the formation of hydrogen sulphide, and this would render special means of ventilating the studio and dark room necessary. When it can be used quite fresh, and in cases where the negatives have not to be kept for any length of time (during which the silver sulphide formed in the film would be liable to decompose) this salt proves to be of great value as an intensifier. The manner of using it is to put a lump about the size of a nut into the developing glass full of water, and to pour it at once on and off the negative; as the potassium sulphide slowly dissolves, the intensification will be effected gradually. It is unavoidably necessary that the negative be intensified in pyrogallic acid before fixing, and then washed; the intensification will then proceed according to the normal process. The negative turns, at the second intensification—that is, with potassium sulphide—of a brownish-purple colour, which can be strengthened till the required degree of intensity is attained.

Professor Vogel could not coincide in the favourable opinion of this intensifier expressed by Dr. Richard; the hydrogen sulphide that would necessarily be formed would have an injurious effect, not only on the lungs of the operator, but on other chemicals in the dark room.

A letter from Captain Abney was read, describing a curious experiment. Collodion that had neither been iodised or silvered was coloured with eosine, and then flowed over a plate. A spectrum was made to fall on this plate, and after some time it appeared that, in the places where it had absorbed the colours of the spectrum, the eosine had faded. The plate was then coated with bromide emulsion, and, without being further exposed, was treated with the alkaline developer, when a precipitate of silver showed itself in the parts that had been affected by light. An interesting discussion on this subject ensued.

According to Herr Quidde, similar phenomena with other substances had occasionally been observed, and he attributed them to an after-action of the rays of light. Many bodies, after being exposed to sunlight, became shining and phosphorescent in the dark, and it would seem, at any rate, possible that such phosphorescense might possess actinic action. If this view be correct, there must be numerous substances of this kind which could have actinic power impressed on them by light, though it might be in various degrees, and in the large majority of instances this power would not be visible to the eye.

Herr Bergmann informed the meeting that he had received from the Government Office for the Administration of Railways a reply to the petition for permission to send pyroxyline by rail. The reply was to the effect that the petition had been duly considered, but that it was found impossible to comply with the request it contained. On the one hand, it was extremely difficult to distinguish photographic pyroxyline from gun-cotton, a highly dangerous substance; and on the other, the conditions on which alone pyroxyline could be permitted to be transported would be exceedingly onerous, and the control and proper regulation of them scarcely practicable.

Dr. Vogel observed that every railway official could easily distinguish between gun-cotton and pyroxyline: the latter is soluble in a mixture of alcohol and ether, the former is insoluble. Again, by moistening pyroxyline with water or alcohol, and packing it in well-stoppered bottles, or in tin cases, all danger was removed, and it became perfectly safe for removal and transport. It would be easy for any official to satisfy himself that a pyroxyline had been properly moistened.

Talk in the Studio.

Filtering Papers.—The white, unsized filtering papers are classed as Swedish, Rhenish, English, and Scotch. Sweden has obtained a reputation for the superior quality of its filtering papers, which are composed of flax fibre, the fibres being very much crushed and broken. The Rhenish is a flax paper, more fibrous in its structure, and consequently less dense than the Swedish. This is due to the fibres being less broken and crushed. The English white filtering papers have a little cotton mixed with the flax, and the fibres are very much crushed and torn. Thus these papers differ more in their physical characters than in their composition. The foreign grey filtering papers are of more composite character, having a considerabe quantity of wool in their composition—said to be used to render the paper absorbent. It is extremely difficult to recognize the nature of the fibres used in these papers, owing to their crushed and torn condition. A flax fibre, when crushed, resembles that of cotton, and it requires to be traced further to establish its identity. The Japanese also make a filtering paper from the liber tissue of the mulberry, which has very course meshes, and seems only adapted for use as a sieve. Besides the features referred to as characteristic of the Swedish papers, their freedom from inorganic materials is by no means the least recommendation of the best grades, and leads to their adoption in all processes where qualitative analysis is involved. —*New Remedies*.

Dextrin Mucilage.—As an adhesive, dextrin is superior to gum-arabic in many instances. It is used for preparing the mucilage on backs of postage stamps and on the edges of envelopes. As a label paste, particularly on glassware, it forms an excellent mucilage. Dextrin, two ounces; acetic acid, one ounce; water, five ounces; alcohol, one ounce. The dextrin should be dissolved in the water and acid by means of a water-bath, and the alcohol added afterwards.—*Druggists' Advertiser*.

Cleaning of Plates and Lenses.—All persons who work in photography know, or should know, that to clean lenses and to preserve the polish of their surfaces, they should not be wiped with a cloth, but, after having removed the dust by means of a brush, they should be covered with a thin coating of grease, then wiped with a piece of very soft chamois. An amateur asserts that for this purpose there is nothing better than chicken grease."—*Bulletin Belge*.

Dusting Plates.—John M. Blake says, in our *Philadelphia* contemporary, when the air is cold and dry it will sometimes be difficult to dust a plate properly, on account of the electricity excited by the brush. When the back is brushed the particles of dust jump around the end on to the face, and then again, when the face is brushed, they jump around on to the back. The harder we brush the more we get into trouble. But no matter how excited a plate may have become, we can straighten things out at once as follows:—Dust the back again, and at once breathe on this back surface to form a conducting coating. This film of moisture, though very light, and on only one side of the plate, discharges the electricity on both sides. Then carefully and lightly dust the face, best before the moisture has evaporated from the back, and the adhering particles of dust will leave at once.

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To Correspondents.

Col. (Royal Artillery).—There is no work devoted to dry processes, that we remember. There have been several pamphlets on special and individual processes, like Mr. Mudd's tractate on the collodio-albumen process, Major Russell's work on the obsolete tannin proprocess, &c. Captain Abney has just issued a work on the emulsion processes.

Housekeeper.—Oxalic acid is often used for removing "iron mould," which is simply a stain produced by oxide of iron. Tartaric acid is also used. Proceed as follows:—First, damp the stained part of the cloth in water, then apply a weak solution (15 or 20 grains to the ounce) of tartaric acid in water, and lay the article in bright sunlight, keeping the spot wet with this acid solution until the stain is removed, which will require from a few moments to one or two hours, in accordance with the intensity of the stain. In case silver and developer are in close proximity or superimposed, first remove the silver by the proper agents, then thoroughly wash the fabric until no trace remains of the agent used in the removal of the silver.

B. B (Leicester).—Our correspondent is somewhat indefinite in his request. He wishes to know the best method of producing a photograph upon opal glass. Photographs can be produced on opal glass by the collodion process, by the albumen process, and by the carbon process; but, from an incidental allusion in his letter, we presume he wishes to work the wet collodion process and camera printing. In its general operations the process is similar to that employed in producing collodion transfers. A moderately ripe bromo-iodized collodion, without too much bromide, and a tolerably new bath, produce the best results. A one-grain pyro developer with half a drachm of acetic acid to the ounce produces good results. A point of vital importance is not to carry the development too far. The eye will gradually get educated to produce the right result, but experience is necessary to give certainty in developing exactly rightly. Avoid the ground opal, from which the film is apt to split. Some of the finest opal glass pictures we have seen are produced by collodio-chloride of silver.

J. D. F. (Jamaica).—We have often cautioned our readers against attempts at amateur varnish making, but there are circumstances, nevertheless, which render it desirable—when a good varnish cannot be easily procured, and the materials are at hand, for instance. The formula to which you refer appeared in our Year-Book some years ago. Here it is:—Two pounds orange shellac, clean and good, well broken up; one pound sandrac; two gallons methylated finish, or methylated spirit. Put the whole into a two-gallon tin bottle, and let it stand in a warm place for two or three days, shaking vigorously now and then; let it rest two or three days, and draw off clear, and it is fit for immediate use. Add another half-gallon of finish to the bottle, and repeat the treatment; the rest must be filtered. Make a number of filters out of common blotting-paper (one thickness of paper only), funnel shape, and cut out of such a shape and size that, when turned up, they are about four inches deep and three diameter. Overlap the joint a quarter of an inch, and gum it well with thick gum, and turn up the apex a bit for security. Procure three or four glass vessels rather less in diameter than the filters, and twice their depth. Fit a filter into each, turning the paper over the edge and gumming it on. Now fill with varnish. In an hour or so, perhaps, a fourth will have run through. Refill the filter, but do not repeat the filling more than once. Place a piece of glass over each, and when no more varnish will run, cautiously remove the filter, pour off the varnish, and begin again. Make enough to last two or three years. The filtration is not an operation one would like every few months, and the older the varnish gets the better it is.

A. Borland.—We shall be glad if Mr. Borland will send his address, as we have a letter from America for him.

R. F.—The examples of cabinet portraiture are very creditable. The tone is a little too cold for our taste, but some persons like a cold black for portraiture. The techincal qualities are altogether good, and there is good taste also. The chief defect in examining a dozen is want of variety. They are nearly all in one position, the head turned in the same direction, the chin thrown up, and lighted alike. Try variety for your own sake.

T. B. Harding, (Napier).—Subscription duly received. Reference will be made respecting the numbers.

Ownership of Negatives.—As a rule, there is no doubt in our mind that the negatives belong to the photographer. He, as a rule, undertakes to produce photographs for his customer, and when these photographs are supplied, the customer has nothing to do with the appliances by which the photographs were produced. Neither camera, nitrate bath, nor negatives belong to the customer, only the photographs which he commissioned the photographer to produce. But in your case a different element is introduced which somewhat complicates the case. You undertook to work at so much a day—two guineas a day for time and expenses. Hence you became the customer's servant for that time, and he may not unnaturally say what you produced during that time belonged to him. The difficulty will chiefly rest in what meaning is attached to the word *expenses*. Was that supposed to mean cost of photographic materials? If it was, then, as your worked in his time, and agreed that expenses were to be covered by the day's wages, there is some fair ground for the claim made to the negatives produced. The best bargain you can probably make now is to claim for the cost of materials, as the negatives are universally supposed to remain your property.

E. Benthin.—We must answer you fully in our next, as there is not time now before we go to press. We were in the habit of using the American coating boxes, and we lifted the plate from the box to examine the colour by the yellow light of the dark-room, and the eyes soon became accustomed to estimate colours in that light. When we knew that the boxes were in good working condition, we frequently worked by counting seconds, merely checking the result by the eye. We tried various accelerators, but generally preferred bromide of lime. We fear that you could not make suitable plates by the plan you propose. More next week.

Several Correspondents in our next.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

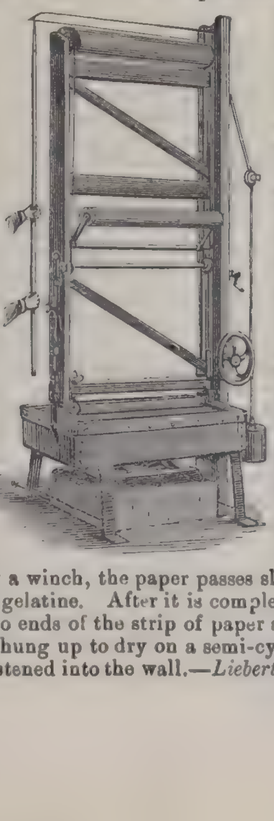
Progress in Balloon Photography—The Photographic Operation of the Eye—Electric Lighting in London.

Progress in Balloon Photography.—We are glad to see that Mr. Woodbury is going to work in earnest on the subject of balloon photography. During the past week, some progress seems to have been made at Woolwich in the matter of reconnoitring from balloons, and Mr. Woodbury, we believe, is about to try his apparatus in connection with Captain Templar's experiments. Many of our readers are familiar with Mr. Woodbury's invention to secure photographs from a height without any one ascending in the balloon as operator; and all that is necessary is sufficient ballast to keep the balloon steady, and a camera properly swung and weighted to keep it in a horizontal position. Mr. Woodbury attaches to the guy rope of the balloon—for the latter is naturally fixed to the earth—two or more electric wires, and, by means of a current sent up from time to time, he caps and uncaps his camera. A very brief exposure is all that is necessary, for there is plenty of light at hand, and Mr. Woodbury has recently adopted a simple method whereby he can secure four views at every ascent. He merely makes use of a square block, upon the four surfaces of which are sensitive films, and the block makes one turn, presenting a fresh surface, at any time the operator below desires to change his plate. A very simple electric arrangement is sufficient to effect this turning of a block, and the only other electrical arrangement has to do with opening and shutting the camera. We do not know the nature of the latter arrangement, but one may well suppose a cap so constructed as to remain open so long as electrical contact is continued below, if, that is, more than momentary exposure is necessary. Mr. Woodbury has, moreover, an arrangement which prevents the balloon from gyrating, for it seems that the unsteadiness of the balloon is one of the main difficulties with which the photographer has to contend. Nadar, of Paris, succeeded very well in overcoming such movements, and the late Sir Charles Wheatstone, to whom Nadar's results were shown, spoke very highly of them. As is only natural with men who have worked out a difficult problem, Nadar has kept the details of his balloon photography to himself; but it is something to know that he thinks highly of Mr. Woodbury's plan. The latter, in a visit he recently made to Paris, hoped to make a few exposures from the captive balloon of M. Giffard, which makes daily ascents from the Place du Carrousel, but the right of photographing from this balloon had already been sold, and so Mr. Woodbury had perforce to put away again the Swan plates with which he was armed for the purpose. From the fact that no balloon photographs are rife in Paris just now, we may well conjecture that the "right" in question has not been made use of so far, or there have been greater difficulties in the way of exercising it than was supposed. As the Paris balloon is a very stable affair, and makes such frequent ascents, there should be little difficulty, one would think, in getting over difficulties. The mass of light that floods in from all sides is one of these, for it is lighter everywhere than on the earth, just where you want to direct the camera, and, for this reason, we should think all balloon pictures would necessarily be a little flat. A word, perhaps, may here be said of the balloon experiments at Woolwich, where Mr. Woodbury hopes for a trial of his apparatus. These experiments are under the charge of Captain Templar, who has two main objects in view: the first is to employ hydrogen instead of coal gas as lifting agent, and the second is to discover how much this gas may be compressed, so as to render possible the carrying sufficient of it with an army for reconnoitring purposes. Every tyro of chemistry knows that you can obtain hydrogen by the decomposition of water or steam, and there is nothing scientifically new, therefore, in the fact that Captain Templar has sent up an æronaut in a balloon filled with this lightest of all gases, obtained in the manner stated. But inasmuch as he has, nevertheless, been the first to do so, at any rate in this country, manufacturing his hydrogen in the same rough and ready manner that would have to be followed in the field, Captain Templar has practically taken a very wide step indeed in the matter of military ballooning. The other day his captive balloon rose to a height of seven hundred feet, filled with hydrogen, an ascent whence observations or photographs might have been taken of a hostile army with considerable advantage. Captain Templar hopes to be able to carry about his hydrogen in a compressed form—that is to say, in cylinders, whence it could be drawn off like beer from a barrel. It is now possible, as our readers may know, to purchase oxygen and hydrogen commercially, the same being sold in strong iron tubes or canisters, under a pressure of ten or fifteen atmospheres—or, in other words, the canister contains ten or fifteen times as much gas as its size. The lifting power of hydrogen gas is practically about seventy pounds per 1,000 cubic feet, and not less than 8,000 cubic feet are necessary to lift a small balloon with aeronaut and ballast. But this quantity, it is anticipated, may, when compressed, be carried in a single military waggon.

The Photographic Operation of the Eye.—Referring to the experiments of M. Boll, the *Athenæum* points out that Sir John Herschel, in the Royal Society's Transactions of 1842, stated, when drawing conclusions from some remarkable photographic effects he was then studying, that the phenomenon of vision was of photographic origin, the images of external objects being printed by the solar rays on the retina or the choroid coat of the eye.

Electric Lighting in London.—London seems determined not to let the matter of electric lighting drop without further agitation. The subject has attracted the attention of well-nigh every gas company in the metropolis, and the fact that it is so frequently discussed shows clearly that it creates more than a passing interest. Rumours are rife of a large London company in which the interests of the foremost electric engineers are to be blended. Certain main thoroughfares, bridges, and squares, are to be lighted by electricity, and its capacity for every-day use thus practically treated.

APPARATUS FOR THE PREPARATION OF CARBON PAPER.



The machine here represented is intended to be used in preparing carbon and transfer paper. It consists of two cylinders, an upper one made of polished wood about 15 C. in diameter, and a lower one of metal much less in diameter. Both of these rest in a wooden frame which, by means of a screw and nut, can be raised or lowered so as to bring the lower roller to just the surface of a solution of gelatine contained in a zinc trough; the trough itself rests on a water bath. A strip of the paper to be gelatinised is then passed over the two cylinders, and its ends are fastened together by means of gum or gelatine; a third cylinder resting on moveable iron arms between the other two, serves by its own weight to keep the paper tight. When the upper cylinder is turned by a winch, the paper passes slowly over the warm solution of gelatine. After it is completely coated with gelatine the two ends of the strip of paper are cut through again, and it is hung up to dry on a semi-cylindrical piece of wood that is fastened into the wall.—*Liebert's Photographie en Amerique.*

PHYSICS IN PHOTOGRAPHY.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

WE have finally to return to the subject of photography with the light of those rays which are usually inactive upon sensitive salts, and at which we have already glanced.

To Dr. H. Vogel, of Berlin, is undoubtedly due the new interest which has been taken in this branch of photography. Towards the end of the year 1873 he announced that he had discovered a method of making the non-actinic rays in certain circumstances actinic. We quote his own words†:—"I have found that bodies which absorb the yellow ray of the spectrum make bromide of silver sensitive to the yellow ray. In like manner I find bodies which absorb the red ray of the spectrum make bromide of silver sensitive to the red rays. For example, by the addition of *corallin*—which absorbs the yellow ray—to a bromide of silver film, it becomes as sensitive to the yellow ray as to the blue ray." In articles which he published at various times he enlarged on this idea, some of his most striking experiments being conducted with aniline dyes of various kinds. He and Waterhouse have shown that a silver bromide film becomes sensitive to the part of the spectrum which certain of those dyes absorb, whether the absorption be due to a compound formed between the dye and silver, or to aqueous or alcoholic solutions. This at once opened out a large field for inquiry, and made research in this direction doubly interesting, owing to the fact that apparently certain physical laws would have to be modified if Vogel's theory were correct. He divided the action of the substances so added into two: the dye he called an optical sensitiser for that particular part of the spectrum which is absorbed, whilst bodies which absorbed the halogen (thrown off by the reduction of the molecule) he called a chemical sensitiser, and a combination of both properties in a dye made the film sensitive to the absorbed rays. The theory of the optical sensitiser seemed to clash with the received notion of molecular motion, but before analysing the results the accompanying figure should be studied, which is taken from Vogel's work on Photography (Fig. 5).

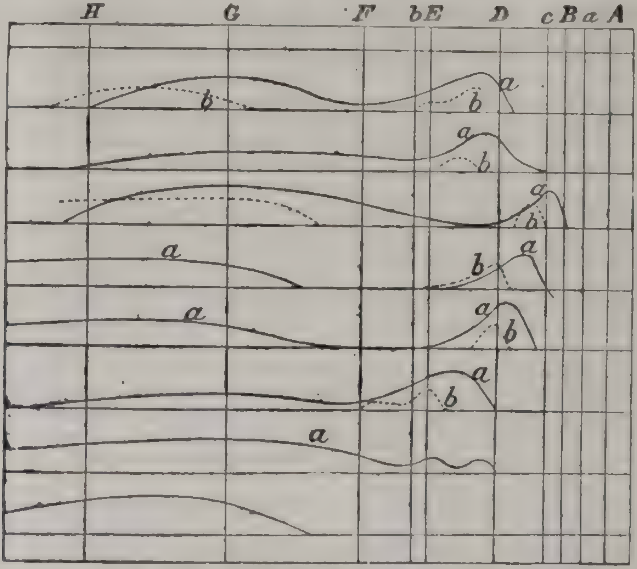


Fig. 5.

Let us take one or two examples from the above figures, and see whether they agree with Vogel's assumption. We will take VIII. as a standard of comparison, being the effect on unstained bromide, and this will be fair (though it does not take the form given, shown in Fig. 2, p. 529), as it is presumed that this sample of bromide was worked with throughout. Comparing (say) IV. with VIII., we see that in the blue the sensitivenesses, as shown by the ordinate of the curved line, are very similar, but that the action is got in the yellow. In examining cyanine blue, the dye used, we find that the absorption takes place just at that part of the spectrum. Similarly, examining V. and VI., we arrive at the same results, and in fact the absorption of the rays invariably corresponds with the photographic action.

It will be seen, then, that without doubt the principle Vogel contends for might explain the phenomena. He, however, found that if the silver bromide film had been prepared with an excess of bromide, that the actions indicated did not take place. This seemed to indicate a weak spot in the theory, and it pointed at first sight to the idea that it was necessary to form a coloured compound of the dye with silver, in order to render it sensitive. In the majority of cases this still seems to be, if not a necessity, yet a cause of increase of sensitiveness to the region of the spectrum absorbed. Vogel, however, shows that, if the silver bromide film, prepared with an excess of bromide, be washed, and be then treated with a dye, and a chemical sensitiser, such as tannin that the same action takes place. The theory of a silver compound in this case must evidently be abandoned, and would point to the correctness of Vogel's theory, did not other experiments in a certain degree offer an explanation more accordant with our preconceived ideas. Let the dye be mixed with *plain* collodion, and a film of it be exposed to the spectrum, it will soon be visibly evident that there is a marked effect produced by the rays absorbed. Thus cyanine blue will be found bleached in the region near D and below it. If over the dyed film of collodion thus exposed, a film of silver bromide in collodion be poured in the dark, and the alkaline developer be applied gradually, a silver image of the altered portion of the dyed collodion film will make its appearance, although the film of silver bromide has received no impression by light. The explanation of this remarkable phenomenon is to be found in the theory of alkaline development already given in these articles. The reduced dye acts as a nucleus on which the metallic silver will first adhere, and this first reduction of metallic silver determines the position which the further reduced silver shall occupy, and thus the image is built up. When there is an excess of soluble bromide in the film the developing action will be retarded. This series of experiments seems, then, to indicate that there is no need for optical sensitisers to alter the oscillation of the molecules or molecular groups, but that, in some instances, the same theory may be applied to the action of dyes as may be applied to the deposition of metallic silver on a glass plate which has not been freed from "dirt," a disagreeable phase which is well known to photographers at large. The explanation of the diagram is, therefore, not hard to understand when viewed in this light. The theory of rendering the silver salt sensitive to the red has already been explained, and the same explanation is naturally applicable to those dyes which, when brought in contact with silver, from a definite compound with it.

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* Continued from page 470.

† PHOTOGRAPHIC NEWS, December 5th, 1873.

There are many interesting physical researches which spring out of these various experiments, amongst which may be mentioned a method of determining the size of atoms and their arrangement in the molecule, and last, and not least, the production of permanent photographs painted in natural colours by light itself. The attempts made of late to form photographs in proper colours by taking distinct negatives through blue, through green, and through red media, and then printing positives from such, and finally obtaining red, green, and blue prints, and superimposing them, is not a step in a scientific direction, since it is utterly impossible to secure monochromatic colours which are pure enough to give the truth of nature. Such efforts, though they may be commercially valuable, yet are not to be followed with too much seal by scientific photographers.

We may now axiomise the results we have indicated :—

1. That the undeveloped photographic image on a silver compound is formed by the reduction of that compound.

2. That the compound may exist in two (or three) molecular groupings.

3. That the compound can only be sensitive to the rays which it absorbs.

4. That the reduced silver compound may be rendered incapable of development by combining with oxygen.

5. That light of every refrangibility may cause an acceleration of oxidation, provided the compound acted on absorbs such light.

6. That the oxidation of the compound reduced by any particular ray may be as rapid as the reduction, and thus to give a false idea of their limit of sensitiveness to the spectrum.

7. That the oxidation of the reduced silver compound may account for the phenomenon of photographs in natural colours hitherto produced.

8. That in all probability the action of dyes on silver bromide is a secondary one.

VARIETIES.

BY EDWARD DUNMORE.*

At the pressing request of our worthy Secretary to supply a paper for this evening (he seems, by-the-bye, to experience considerable difficulty in getting members to energetically respond to his invitations), I have endeavoured to prepare one, although I am afraid it will be somewhat of a desultory and mixed character, for the difficulty of selecting a subject that will, in addition to being interesting and practical, possess the charm of novelty, is a task more than I feel competent to perform ; still, rather than our opening session should be entirely paperless, I have endeavoured to string together a few topics that may be suggestive, or provocative of discussion, if nothing more. Well, then, to begin. This very difficulty of providing papers should certainly be a subject calculated to interest *every* member of this Society, and, instead of our Secretary being driven to his wits' end to get them, he ought to be supplied with not only one paper for an evening, but *several*, thus having others to fall back on in the event of the promised reader not "coming to the scratch." The paper question has, however, been much talked of amongst us, but, it seems, has not advanced a stage further than the discussion. I would, therefore, suggest, if papers *cannot* be obtained from members of the Society, a series of subjects should be selected by us, and a competent man outside our Society requested to write a short paper on a subject we name, for either love or money, that could be read by our Secretary in the event of none being provided by our own members, for I apprehend little or no interest can attach to our meetings if we have nothing special to listen to or discuss. The result will be that at no very distant date this, at present, flourishing Society will die of sheer inanition ; but it is to be hoped, numbering, as we do, so many practical men amongst us, that such a fate will be postponed for many years. It will, however, require something more than a passive interest to sustain its vitality, and I hope to see in this session, upon which we this evening enter, many unmistakable signs of its continuing energy and usefulness, and that every member will do or say something to sustain its credit.

Now to change the topic. The blistering of prints on albumenized paper seems to have been more than usually prevalent in the past summer, and more than one well-known writer has suggested that it is caused by the excessive dryness of the paper previous to sensitizing, and that if the paper is left some time exposed to a moist atmosphere, the evil will disappear. I regret I am not able to coincide in this theory, as I have found that paper kept in a cool and slightly moist atmosphere will blister just as much as if it was dry. Having, as I have, to superintend the preparation of thousands of sheets monthly, I find no precaution will prevent certain samples of paper from blistering entirely, although, by observing certain regulations, the evil can be mitigated. It is a mistake to think if blisters disappear on drying, the proofs are none the worse, as it will be found such proofs will become spotty and imperfect much sooner than those which have not been afflicted with this complaint. Whatever may be the cause, it is evidently connected with the preparation or albumenizing of the paper. It may be due to the sizing, or it may be that the albumenizing is too rapidly conducted, the albumen not being allowed time to thoroughly attach itself to the surface of the paper, before it is removed and hung up to dry ; but whatever the cause, it is outside the processes to which it is subjected by the photographic printer, namely, sensitizing, printing, toning, fixing, and washing. A certain remedy—but, unfortunately, rather impracticable when large quantities of work have to be done—is to pass the toned print through a bath of methylated spirit, which entirely removes the tendency to blister, without in any way injuring the proof.

Again to change the topic. The alkaline toning bath is the toning bath, perhaps, more generally in use than any other. I allude to lime baths. I shall, perhaps, surprise some when I tell you that this so-called alkaline bath will work better if it has an acid reaction on litmus paper. It may not be generally known that the effect of very weak acid upon the colour of litmus paper is much more readily observed when the effect is watched by gaslight than by daylight, and litmus so slightly changed by acid as to be imperceptibly altered by daylight is quite pink when examined by gaslight ; and I have found lime toning to progress much more satisfactorily if the solution will change litmus slightly pink when examined under these circumstances than if it be neutral or slightly alkaline.

Again, another topic—clean hands. It is much more easy to keep them from being stained than to remove stains when made. The remedy is *care* and *dexterity* of manipulation. Some manipulators could not, I believe, if their very lives depended on it, avoid making themselves in a mess, or get through a day's work without having hands as black as if they had been intentionally dyed. I don't think they would be happy or think themselves photographers if they did not succeed in making themselves grimy and untidy. I would recommend the use of a pair of good dog's skin gloves, well rubbed with warm wax or paraffin, as being comfortable to wear, and effectually keeping the fingers clean. India-rubber gloves answer the purpose very well, but some are very unpleasant to wear. I mention this subject not so much to call attention to appearances as to affecting the health of the operators, especially now, as the cold weather is approaching, the skin becomes more hard and inelastic, and more easily abraded than in warmer weather, when it is soft and pliant, and is consequently more likely to be injured by the chemicals, inducing dangerous, or, at least, troublesome, sores. I quite believe eruptions upon the hands we hear so much about might be entirely avoided if the operator was rather more imbued with the spirit of economy and manipulatory neatness. For my part, I always look on so many stains as so much wasted material, and if this feeling could be realized by those engaged in photographic operations, it would be a general benefit to both employers and employed.

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* Read before the South London Photographic Society.

Once more to change the topic. Respecting landscape photography, no good results can be reasonably expected unless the sun shines, for general landscape subjects; sometimes a special view may perhaps be better taken on a dull day, but in the majority of instances plates exposed without sunshine are plates spoiled. I fancy, from the little experience I have had, this rule is especially applicable to slow dry plates, or plates several times slower than wet ones, the beauty of the photograph depending, as it does, less upon the beauty of the composition as seen with the naked eye than upon the illumination of it. One has only to watch the effect of the light on some subject with and without sunshine to at once realize the difference and importance of having the landscape well lighted. A weed, a bunch of leaves, or some trifling object that on a dull day is scarcely noticeable, will with a touch of sunlight spring into importance, and completely alter the character of the view. Photographic beauties lie hidden in the most unsuspected localities, and are systematically overlooked in the idea of the necessity of going to some place of artistic repute to be enabled to procure pictures worth the trouble of taking. How often such trips, made on the representation of a friend who as an eye for colour, end in a disappointing fashion to the photographer I need not say, therefore I would impress on all incipient photographers—and others, too, for that matter—to thoroughly acquaint themselves with effects of light and shade before they indulge in landscape work, as it quite as important to be understood in this department as by the portraitist. In these days a photographer who had no proper ideas of lighting the sitter would be laughed at, and his work properly despised; yet, I believe, lighting the landscape is by many little considered, or not at all. If the sun shines, that fact is held sufficient; as to where it shines and what it lights up or casts into shadow, is hardly thought about, so long as it does not shine into the lens. This is a happy-go-lucky style of working that occasionally makes a good picture by a fluke, but a great many bad ones, and as the principle on which to go is not understood, the probability is that a special success could never be duplicated unless by a rare chance.

I have now arrived at the last item on my list, and, if I have said nothing new, the subjects I have touched upon more or less affect all photographers, and force themselves into prominence in the practice of all the disciples of the so-called black art. I will therefore leave the collection of varieties to your consideration, and hope it will be sufficient to induce a discussion for the evening, and papers for future ones, one of which I would suggest should be a practical exposition of the development of *over-exposed* and *under-exposed* dry plates, by some good dry plate worker.

PHOTOGRAPHIC EXPERIENCES IN PARIS.

BY F. YORK.*

Our worthy President has often reminded us that the proceedings of the South London Photographic Society are not so formal as those of the Parent Society, and which fact he characterises as the great element of our success, as it encourages those who feel a little diffident when addressing a meeting. Our indefatigable Secretary, always on the look-out for something to keep us alive, pounced upon me, thinking I must have something to impart after my recent trip to Paris. I should not have appeared before you to-night had I not derived some little experience on a subject which appears to be absorbing much attention. I allude to the gelatine-emulsion process, which has now taken a fresh start. I am not an experimentalist, and possibly should not have adopted it had not circumstances compelled me to do so. I purpose showing you on the screen some of my results with both wet and dry plates, that you may form some idea of the comparative merits of both. Previous, however, to doing this, I will give you my opinions of the best way to get to Paris, on the arrangements for working there, and on the Exhibition; and, lastly, show the views, which I hope may lead to an agreeable and useful discussion.

Routes.—For those who suffer from sea-sickness the route *via* Dover and Calais is the best, the voyage being under an hour, and the steamers more commodious. The departures are always at fixed periods, and the arrival in Paris convenient for dinner. For returning I prefer the tidal service, *via* Boulogne and Folkestone, if the departure from Paris is about ten o'clock, a.m., as it enables you to get away more comfortably; and the later arrival home is not of so much consequence as in Paris, where there is some doubt of your getting the accommodation you anticipate, and being then obliged to accept what offers. By the route *via* Newhaven and Dieppe there is a tidal service; but on certain days the voyage is performed in three and a-half hours, and the whole journey about the same time as the Dover and Calais route. The new steamers are most commodious and rapid, second only to the Holyhead and Kingstown line. This route is always the most crowded during the summer season, being a little more than half the expense of the South-Eastern, and London, Chatham, and Dover routes. A first-class return for a month is £2 15s. as against £4 15s. on the other lines. Let me advise you to avoid the cheap night-service of eighteen hours by either route; and if you wish to be economical take a second-class ticket by the day service. I have tried various routes, viz., Southampton to Havre, by the Seine to Rouen, and from London Bridge to Boulogne, and thence per *diligence.* If any of our friends are bicyclist I cannot speak too favourably of the French roads—they are magnificent, being constructed for military purposes, and kept in splendid condition.

Advice.—Ask the guard which side you get out to embark, rush on board, and deposit your hand parcels on the most comfortable seat on the poop looking aft, and if you wish to go below, secure a couch by depositing a parcel on it. Then you have time to look about, as passengers observe the arrangement of priority. Again: when you disembark, inquire which is the gangway, collect your parcels, and rush to the train to secure a window seat. On arrival in Paris secure a cab first thing, deposit your hand parcels in it, receive a ticket from the driver, who will fall into the rank whilst you return to look after your heavy baggage, which you ought to register, as it removes all anxiety *en route*, and the cost of which is one shilling. Cab fares during the day time are always the same—1*f.* 50*c.* for one having two seats, and two francs for one with four seats, with twenty-five centimes for *pour-boire* or "drink money." There is but one charge, whatever the distance, inside the fortifications. When I travel in England I generally send forward my luggage per goods train, to avoid the trouble of looking after it. I did the same thing in going to Paris, which caused me an immense amount of trouble. There was, first, the delay of ten days, and again the loss of one day in passing it through the octroi. I consigned mine to a French house I do business with, and they endorsed the D/L, and sent one of their clerks with me. The first hitch was the omission to get the authority from the firm to make the declaration. When he returned he found business suspended for over an hour for *dejeuner.* We followed suit. The delay in getting my photographic apparatus from England enabled me to visit all the places I intended photographing, noting the best hour for that purpose, and getting the necessary permissions, which are rather numerous.

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* Read before the South London Photographic Society.

1. For street work you place yourself under the surveillance of the police.
2. For the national palaces and public works you must apply to the Minister of Public Works.
3. For the national fine art galleries you have to apply to the Minister of Fine Arts.
4. For the municipal parks and squares application is necessary to be made the Prefect of the Seine.
5. For the churches to the curés or architects.

Photographic manipulation in Paris is much the same as here. There appears to be a much greater number of outdoor workers there than in London. Most of the best portrait photographers undertake outside work, and execute it themselves. The larger number of houses have courtyards; and, if there be no studio on the top, you will generally see a dark box on wheels at the bottom.

I cannot speak favourably of the Parisian apparatus. It is a common thing to see a studio-stand and camera on the street, the lens fixed into a rigid front, and the camera cocked at such an elevation as would make an architect shudder when he saw the converging lines. This does not apply to all. The appliances of such houses as Braun, Levy, Lachenal, &c., are most complete. I have noticed most unique camera-stands eighteen feet high, the legs forming a ladder for going up to the camera.

The number of street workers being so great, the prices are very low. Cards sell from ten to twenty-five centimes, and cabinets and stereos. at half-a-franc.

The regulations for street-working, since the Franco-Prussian war, are very complicated if enforced; strictly speaking, you are not allowed to photograph in any of the twenty-two *arrondissements* of Paris without the special permission of the Commissioner of each. I had a friend who was an old school-fellow of the Prefect of Police, and through him I got a general order for all, which saved me a large amount of trouble.

There are advantages connected with such disadvantages. You take up your position with the sanction of the police, and in a measure under their protection. I never ventured to rely on this to the extent that French photographers do, who I have seen leave their cameras in the middle of crowded thoroughfares whilst away developing. Many of you, no doubt, are familiar with the position of the Grand Opera House. To take a photograph of this it is necessary to place the camera exactly in the middle of the Avenue de l'Opera, which is about as crowded as Regent Street in the forenoon. When I was focussing for this view I was in dread of being run over, although beside me stood a large camera which a Frenchman was working with the greatest composure, leaving his camera uncared for during long intervals. I found him at work there, and left him, with his large negatives on the pavement, leaning against the wall of an unoccupied house. The Porte St. Denis is situated in a very crowded thoroughfare. I was taking it on a cloudy day, with occasional sunshine. After waiting some time the sun shone out, and I put the camera back against the kerbstone whilst I went into the middle of the road to focus; but when I went to fetch it I found it open, and the film partly rubbed off. I heartily wished the person who was so inquisitive had on white kids. I had to wait a long time before the sun shone out again, when I then succeeded in getting a nice negative. This was the most trying job I had.

The facilities for working in the streets are very great—wide pavements and low trees, giving room for the tent and shelter from the sun. The atmosphere is very clear, allowing subjects to be taken with much better effects of light and shade than in London, where the atmosphere is very perceptible if the sun be shining very much to the right or left of the subject to be photographed.

Redtapeism is more rampant in France than here. A gentleman told me that he was taking a photograph of the July Column, which is situated in a large open space. He had permission to work in the fourth *arrondissement*, but it was necessary for him to take it from the twelfth—the other side of the boulevard—when he was stopped by the police, who would not allow it without an order from his chief. I had an order from the Minister of Fine Arts to do interiors at the grand Trianon. The day being calm and favourable for outside views, I decided on doing these first, when I was stopped by the Registrar of the Palace, who said he could not allow it without an order from the Minister of Public Works. I went back to Versailles, hoping to find some one there at the public works department to endorse my order. I got it done by the Registrar of the Palace, and returned, but it was no use. Monsieur ——— was inexorable. He said he recognized no one but the Minister of Public Works. This was a great disappointment, as I wished to do it before the foliage got too heavy. The weather prevented my going again until the trees were fully out, and so prevented my taking many charming little "bits" I had looked out. I was working in the Bois de Boulogne when a heavy thunderstorm came on, which prevented my working for two hours. I set up the apparatus, and was just in the act of exposing when one of the park rangers came up and asked for my authority, which I produced. He stated that I must not work after twelve o'clock. I remonstrated, and told him that it was not so stated in the order. He said those were his instructions, and he would not allow me to expose until I had a special order from his chief to work later. This I had to do, which took half-an-hour; but in the meantime it had become overcast again, and I had to wait two hours longer for the sun to accomplish it.

I will not here attempt to describe the *modus operandi* of the emulsion plates; I will do that when using the screen. The cause of my being compelled to employ them arises from the dreadful mess made by French operators in copying the pictures in the Louvre by the wet process. M. Ferrier's operators did the same thing here at Windsor Castle and Buckingham Palace, which has almost shut out English photographers from obtaining permission to photograph in the royal palaces. When taking a photograph of the grounds and Trocadero from the gallery of the Exhibition, which is reached by a staircase of about sixty steps, I once followed a French operator, and, noticing frequent droppings from his dark slide, I reckoned eleven drops in going that distance. I was often surprised at the messes made about the building being tolerated.

The great object of my going to Paris was the open privilege to work in the Exhibition, but as it was in such an unfinished state I resolved to do all the outside work first, and make this series the last. There was very little difficulty in obtaining permission to work until ten o'clock, but some trouble to get the time extended until five o'clock. I will not attempt to describe the beauties of the park and Trocadero and grounds—the whole being magnificent. The Exhibition building, for internal grandeur, is far behind our Crystal Palace, or the 1862 building with its grand nave and transepts. There was not a single place where a comprehensive view could be taken, so that the photographs bear no comparison to those of our 1862 exhibition. There were a great number of workers; I have reckoned as many as twelve at work in the Rue des Nations, this being the most favourite spot, and one where the police did not interfere. Their instructions were, not to allow anything but general views to be taken without the written permission of the owner. Many very pretty views could be taken in the grounds. I will not allude much to these tonight, as the object of my appearing before you on this occasion is to talk about dry, and not wet, plates. All the work I did in the Exhibition was by the wet process. There were a number of dry-plate workers. One operator told me that he had exposed sixty tannin plates in a day.

I will now proceed to show the views on the screen; but, before doing so, I should like to remark that if we have our popular lantern evening at Christmas I shall be pleased to exhibit the whole Exhibition series.

The Photographic News.

Vol. XXII. No. 1049.—OCTOBER 11, 1878.

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THE PHOTOGRAPHIC EXHIBITION.

The annual Exhibition of the Photographic Society opened in the Gallery of the Water Colour Society, in Pall Mall East, on Tuesday evening last, when a goodly company of the members of the Society and friends of the art assembled to examine the year's progress as illustrated on the walls of the Gallery. The meeting was a pleasant one, affording, as it does, a pleasant occasion of re-union to many persons of common tastes and interests, which would not otherwise occur. The crowded state of the Gallery on Tuesday evening bore testimony to the readiness with which this opportunity is taken advantage of.

We fear, however, that the general verdict upon the display will scarcely be a satisfactory one. The Exhibition, whilst containing many very interesting contributions, which will well repay a visit, is decidedly inferior to many of the exhibitions of the last few years, and there is little progress of any kind, we regret to say, indicated in the contributions. There is, moreover, a disappointing absence of many of the most distinguished names from the catalogue. There is nothing from Robinson, or from Blanchard, or Mayland, or F. York, or R. Crawshay, or Col. Stuart Wortley, or Marshall Wane, or Abel Lewis, or Warwick Brooks, or Wm. Brooks, or a host of other able photographers who have been in the habit of contributing. With the exception of many interesting examples lent for exhibition by Mr. Warnerke, there are no contributions from distinguished foreign photographers. Last year one of the most attractive and interesting exhibits consisted in a series of Arctic photographs. This year the loan collection of subjects picked up during a ramble all over Europe by Mr. Warnerke constitutes one of the most interesting features of the Exhibition.

The jurors spent a busy day amongst the pictures on Tuesday before the opening of the Exhibition, and completed their work in time to permit the announcement of their awards to be attached to the pictures before opening in the evening. We find the word "Prize" attached to the following:—No. 11, some Highland scenes by Mr. Vernon Heath; to No. 165, a scene near Bettws-y-coed, contributed by the School of Military Engineering. This medal was awarded with a memorandum to the effect that the medal was intended for the actual producer of the picture, and not to the general impersonal "School." We understand, however, that Lieutenant Darwin, under whose charge the school has been conducted since Captain Abney left Chatham, replied that it would be contrary to the etiquette of the situation to mention the name of the individual photographer under the circumstances. As in military arrangements the credit of a victory is always given to the officer in command, the award is clearly due to Lieutenant Darwin himself, and rumour whispered that in this case it would be for his own production. A third prize is awarded to Mr. Payne Jennings, for No. 199, a frame of large instantaneous sea studies. The next medal is awarded to Mr. Augustus W. Wilson, for 293, illustrations of Shakespeare's "Seven Ages of Man," the award really being for one figure—the Justice—in the series. The next medal is given to the Woodbury Company, for plates and impressions produced by the Woodbury mechanical process. The next medal was given to Mr. Cadett's pneumatic shutter, No. 341, exhibited by Marion and Co. It will be seen that a large number of the medals offered have not been awarded, presumably from lack of merit in the special direction for which competition was invited. On this subject we shall enter into more detail in our next.

As we have before intimated, Mr. Warnerke's loan collection constitutes one of the most attractive and absorbing features of the Exhibition. These consist chiefly of specialities full of interest. Here is a large collection of examples of the work of M. Scamoni, head of the Photographic Department of the Imperial State Paper Manufactory, St. Petersburg. All photographers interested in photo-mechanical process are familiar with the name of M. Scamoni as that of an ardent experimentalist in photo-gravure and kindred processes, and here we have results of these varied processes. On another screen we have nearly two hundred illustrations of character in Russia, studies secured in various parts of the country by Mr. Carrick, an Englishman—or, rather, a Scotchman, naturalized in Russia. These studies are singularly interesting, and do not present Russia as in the van of civilization, as she is represented to be by some unpatriotic English politicians. The name of Karelin, whose photographs took visitors by surprize at the last Edinburgh Exhibition, will be remembered by many, and examples of his work will be found in Mr. Warnerke's collection. Denier's process of producing prints from two negatives taken at the same time is also illustrated here. M. Lewitzky is also represented; M. Sapteff, head of the Military Department in Russia, and many other Continental photographers, add to the interest of Mr. Warnerke's collection.

Among the pictures which excited much interest and admiration are the examples of coloured work contributed by the Lombardi Art Company. As, according to the published conditions of the Exhibition, coloured work was inadmissible, and these pictures were of much interest, they are hung on the walls of the staircase and vestibule. The process has been patented as the Poikilographic process, a method of placing the colour under the photograph instead of over it. The results shown are singularly beautiful and effective. The hanging and general arrangements in the Gallery are very effective, presenting a most satisfactory *coup d' œil.* Prominent and attractive are many fine enlargements, chiefly by the Autotype Company and Woodbury Company. Mrs. Langtry, the famous beauty of the London season, whose portraits, by two distinguished Academicians, adorned the last Academy Exhibition, and still attracts attention amongst the photographs in shop windows, takes the most prominent place in this Exhibition, the enlargement in Pall Mall, in our estimate, being the most pleasing of all the portraits of the lady which have been exhibited. Still more interesting as enlargements are the animals—crocodile, lion, tiger, &c.—from Mr. H. Dixon's negatives. These are probably the finest portraits of savage beasts which have been produced by photography.

The Exhibition is interesting as containing many examples of emulsion work, some of which are exceedingly fine, whilst others, especially extra-rapid results, are very unsatisfactory. More in our next on the subject.

Progress in photo-mechanical work is not illustrated, the contributions being few and not new. There is an absence of enamel work generally. There is little attempt at pictorial work, and, so far as we have seen, no combination printing. There is, in fact no attempt of any kind to produce a great picture by photography, such as Rejlander and Robinson taught photographers to expect at one time. Mr. A. W. Wilson's "Seven Ages" is the only noteworthy attempt at photographic genre. Portraiture is worse represented than we have ever seen it in a photographic exhibition. There is some very fine landscape, but not much. Mr. W. Bedford's pictures are exceedingly perfect, but are, unfortunately, marked "Not for Competition," presumably because his father is on the jury. And there are some other fine landscapes; but many of the able men in this class of work are, unfortunately, absent.

AN APPEAL TO PHOTOGRAPHERS AND CHEMISTS.

Our contemporary the *Photographische Correspondenz* publishes the following letter from its valued contributor, Dr. J. M. Eder:—

"Being engaged in investigating the different kinds of pyroxyline and collodion, it is of the greatest interest to me to acquire a knowledge of the observations made by other scientific men working in the same line. It is more especially difficult to obtain an insight into the conditions of spontaneous decomposition, the length of time which elapses before this occurs, and the circumstances which precede and accompany it. I am, therefore, open to receive communications containing information on the special properties of pyroxyline that has been kept for some years, and on the conditions under which it has been so kept; and shall feel greatly indebted to the sender who will thus forward my views. If possible, the origin of and final results of reaction with the pyroxyline should also be stated.

"Any one who can and will send me a sample of spontaneously decomposed pyroxyline will lay me under a debt of gratitude. In this way I entertain a hope to be able, with the co-operation of students of photo-chemistry, to collect material for determining the vexed question of the age which a pyroxyline, when properly kept, can be allowed to attain without suffering injury.

"Communication on the advantage or disadvantage of using long-staple tough pyroxyline for certain purposes in ordinary wet photography with silver salts (*e.g.*, its tearing under some of the intensifying processes), as also on the uselessness in the dry process of several short-staple and tender pyroxylines, would also be of great value to complete and confirm my own observations. At the same time, I ask for permission, when the results of my investigations are published, to quote the authority, or any special statements."

The Editors of the *Photographische Correspondenz* add the request that technical journals who may, in the interest of science, give publicity to this appeal of Dr. Eder's, will also inform their readers that communications of the kind he asks for be addressed to the office of that journal, where they will be thankfully received and transmitted to Dr. Eder.

PHOTO-COLLOTYPE.

BY CAPTAIN WATERHOUSE, B.SC.*

Captain Waterhouse's paper will supply a want many readers have expressed—a complete account of all the operations in photo-collotype printing.

The great defect of all the processes of photo-lithography described in the last section is, that they can only be applied with advantage to the reproduction of drawings or subjects in which the gradation of shade is shown by lines or dots separated by white spaces of varying sizes and at different intervals apart, as in line or stipple engravings and lithographs in line or chalk. Even such drawings, to be successfully reproduced, must be in a good bold open style, and have all the lines or points composing them of an equal and perfect blackness. In the many attempts that have been made to reproduce photographs from nature by photo-lithography or photo-engraving, or to copy paintings and brush-shaded drawings in which gradation of shade is continuous, success, only partial at best, has been secured by breaking up and destroying the continuity of gradation. By the processes of photo-collotype, so called from the printing surface being of gelatine, these defects are entirely obviated, and absolutely permanent photographic prints may be produced in the printing press, almost equal to silver prints in perfect delineation of detail and delicate gradation of shade, but vastly superior to them in permanence and cheapness of production.

Poitevin was the first to recognise, so early as 1855, the fact that the half-tones were better preserved on stones that had been treated with a chromated colloid mixture if, after exposure to light under a negative, instead of being inked all over and then washed with water to remove the superfluous ink, they were first moistened and then inked in with a lithographic roller charged with printing ink.* He seems, however, to have always regarded the stone as the principal printing surface, and treated it by the ordinary methods of lithography. Only a few impressions could be obtained from stones thus treated.

In 1866, Messrs. Tessié du Mothay and Marechal, of Metz, discovered that the stone or metal plate hitherto used as a printing surface might be replaced by a mixture of isinglass, gelatine and gum, treated with an acid chromate, and evenly spread upon a well polished metal surface; because if, after exposure to light under a photographic negative, such a gelatinous surface were moistened, greasy ink applied upon it with a roller would adhere well to the parts of it that had been acted upon by light, and would be taken up by those parts in proportionate quantities according to the intensity of the gradations of light and shade produced on them by the action of light, and their consequent impermeability to water. Photographic prints in fatty ink, reproducing the most delicate gradations of shade without any apparent grain or break of continuity, could thus be produced.†

It will be seen that this process was based on exactly the same principle as Poitevin's photo-lithography, but differed from it in the distinct recognition of the colloid film as the printing surface. Messrs. Tessié de Mothay and Marechal were also the first to recognise the necessity of adding a certain proportion of acid or of oxidising or reducing agents to the chromate salt used for sensitising the gelatine, with the object of rendering the colloid surface more apt to receive the greasy ink, and also of hardening the film so as to enable it to withstand the wear and tear of printing. This they did by exposing the sensitive plates to a high temperature before using, but the effect was produced in great measure by the decomposition of the chromate salts by the acids or other substances added to the colloid mixture.

Messrs. Tessié du Mothay and Marechal printed off their "phototype" plates in a lithographic press in much the same way as ordinary lithographs, but with certain modifications due to the peculiar nature of the printing surface. The principal of these was the use of two inks—one stiff, for giving force to the shadows; the other thin, for bringing out the more delicate half tones.

The "phototype" process as at first proposed laboured under the defect of not being able to yield a large number of prints from a single plate; but, in 1869, it was improved upon in this respect by Albert, of Munich, who substituted a thick glass plate for the metal plate used by Tessié du Mothay and Marechal as a support for the colloid film. His films consisted of albumen, gelatine, and bichromate of potash alone, and he gave them the required solidity and adherence to the glass by first coating the plate with a sensitive colloid mixture containing a large proportion of albumen, and then giving the under side of this first coating a preliminary exposure to light through the glass. The second coating, containing more gelatine, was then applied, and after it had dried, and the photographic image had been impressed upon it, the plate was again exposed from the back, in order to thoroughly solidify and combine the under part of the compound film. The gelatine films so prepared were capable of yielding some hundreds, or even, it is said, thousands, of perfect copies. This process is still largely used by its inventor, and is known by the name of "Alberttype."*

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* *Journal of the Asiatic Society of Bengal.*

* Traité de l'impression photographique sans sels d'argent, p. 78.

† Photographic News, Vol. XI. p. 260.

According to some authorities, Messrs. Ohm, Grossmann, and Gemoser, of Berlin, took out a patent, in 1867, for a method of photo-collographic printing comprising, in addition to the use of glass as the support of the gelatine film, of the double coating of the plate, and of the hardening of the film by exposure of the back surface, the introduction into the sensitive gelatine mixture of certain resinous compounds dissolved in spirit, by which the gelatine film is rendered quite insoluble, and admirably adapted to form a fine printing surface. It is said, on the other hand, that the credit of all these improvements is due to Albert; but, in any case, it is certain that until after the publication of Albert's process early in 1869, Ohm and Grossmann's was almost unknown, and had not come into general use. In October 1869, the Autotype Company in London acquired the patent, and have since worked the process with the greatest success.

(*To be continued.*)

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REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.†

In the next chapter of this treatise is discussed the influence of temperature on the sensitiveness of chromo-gelatine.

As the tendency of moist chromo-gelatine to become insoluble is promoted by heat, its sensitiveness is much more subject to the influence of temperature than that of the same substance in a dry state. Two perfectly sensitive pieces of carbon tissue were sensitized by the author in a three per cent. chromate bath, and then dried in the air beneath two equal photometers; though one of these was kept in a room of 30° C. temperature, and the other in one of 10° C., they both showed the same sensitiveness, and repeated trials gave the same result.

The assertion of some photographers, that in winter chromo-gelatine must be exposed for three minutes, while in summer it need receive an exposure of only one minute, may be true as a matter of fact, but when the reason is given as depending on the difference of temperature, it does not agree with the views of the author; rather this difference is owing to the decrease of the actinic intensity of light in winter, and it may be also to the atmosphere's possessing a much higher degree of absolute moisture in summer.

Though, in the above experiments, the difference of temperature appeared to have no effect, it must be noted that the carbon papers, before being used, had been kept all the time in the same place. Also, in respect to the statement that sensitiveness increases with the temperature, it must be observed that the intensity of light from the sky is usually proportional to the temperature of the air, for the fewer clouds the more light, and the greater warmth due to the solar rays not being enfeebled. In the same way, the rise and fall of the light-intensity, owing to the change of the seasons and of the temperatures peculiar to them, may give rise to a number of erroneous explanations.

The difficulties of manipulation particular to each kind of photographic process in the different seasons of the year cannot here be gone into; but it is of some interest to know that in the carbon process one must work with weaker (about two per cent.) chromate baths in summer, in order to produce the same results as are produced in winter with a stronger (up to five per cent.) bath. If, in hot weather, as strong a solution be employed as gave good results in cold, weak pictures will be obtained without any sign of brilliancy. According to the author, the same difference exists between copying in direct sunlight, and copying in diffused daylight. He found, namely, that a carbon paper prepared in a five per cent. chromate solution gave good copies in the shade, whereas to obtain equally brilliant copies in the sun, the paper required to be sensitized in a solution of from one to two per cent. only.* On this fact, as well as on those previously mentioned, depends, as the author believes, the difference in the preparation of carbon papers in hot and cold weather; the difference of temperature makes itself chiefly felt in the durability of sensitized papers. According to a remarkable statement of Hannot, copies from chromo-gelatine in the photo-lithographic process are harder when taken in the sun, a property that can be made valuable in dealing with different kinds of negatives.

The succeeding subdivision of his subject the author devotes to the influence of incipient insolubility on the sensitiveness of chromo-gelatine. Chromo-gelatines that have been kept in the dark for some time, or at too high a temperature, become, as has been already mentioned, insoluble, as also by being treated with chemical reagents—such as chrome-alum, alum, tannin, gallic acid, &c. Such chromo-gelatines behave, when exposed to the light, in a different way to fresh ones that have preserved their solubility unchanged. On examining the relative insolubility of the two kinds, it appears that the chromo-gelatine which, owing to the action of reagents, has already a tendency to become insoluble, will, when exposed to light, become much quicker insoluble than that which has not given any sign of change. But chromo-gelatine which is thus in the first stage of insolubility does not necessarily give a fogged picture on that account; on the contrary, when treated properly, it can be developed and made quite as clear as a fresh film, at the same time giving a much more intense picture.

It is an undeniable fact that chromatized carbon papers are less sensitive immediately after being dried than they are about three days later. Baden Pritchard, in the Photographic News, 1872, page 92, declares that films of chromo-gelatine for carbon printing are better and more sensitive in three or four days than they are directly after their preparation, though later they soon lost their sensitiveness. The cause of this appears to be an incipient reduction of the chromic acid to chromium oxide, which soon extends throughout the entire mass. It commences even in the dark (though, of course, it is greatly promoted by exposure to light), and its effect is to render the gelatine insoluble to a small extent while in this incipient stage. When this reduction has once started in the dark a slight impulse of light is sufficient to complete it; whereas with a chromo-gelatine which has undergone no change whatever, the light has a much greater work to perform. The following experiment is described by the author. A piece of carbon paper was sensitized with potassium bichromate, and then divided into two, the one part being kept suspended over water, the other in the air, at the end of four days it was found that there was a great difference between the two as regards their solubility; that which had been kept moist being the least soluble. To eliminate the influence of the unequal quantity of moisture contained in the two pieces, they were left for a couple of days in the air, and at the end of that time were in an equally moist state. After being exposed and developed, the pieces which, from being kept in a moist place, had become the least soluble, proved to be much more sensitive than the drier and more soluble piece. The less soluble copied up to from three to four degrees of the photometer more than the other, but had to be developed in hotter water.

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* Photographic News, Vol. XIII, p. 121.

† Continued from page 473.

* Thin negatives produce in a clear sunlight very brilliant and intense carbon pictures, which are quite as good as those copied from a dense negative under diffused daylight.

It is here that the accelerating action of the incipient insolubility or reduction manifests itself. This can be nicely shown by exposing a piece of sensitized carbon paper for a few seconds to full daylight, and then leaving it in the dark for twelve hours. The action of the light will be found to have extended equally over the whole piece, and by comparing its condition with another one that has been kept from all access to the light, it will be seen that the former is much more sensitive than the latter, and gives more intense pictures, which, with a suitable development, are quite free from fog.

The addition of chrome-alum to chrome-gelatine produces a considerable increase in its sensitiveness to light, and this confirms in a remarkable manner the opinion already stated. If about one-tenth per cent. of chrome-alum be added to the three per cent. potassium bichromate solution, the carbon papers that have been chromatised in this bath will be about one-eighth more sensitive than those prepared in a bichromate bath alone—that is to say, they will copy up to about the ninth degree of the photometer, while the latter only do so up to the eighth degree. Paper containing chrome alum is not durable, for, as a rule, it loses its sensitiveness on the third or fourth day to such an extent as to become useless; at the same time it becomes insoluble in hot water.

The incipient insolubility of chromo-gelatine, in whatever way it may have been produced, has the same effect—it increases the sensibility. It is, notwithstanding, unadvisable to produce purposely incipient insolubility as a means of accelerating the exposure. There is a great liability to overstep the line, and to carry the process so far that the chrome-gelatine becomes altogether insoluble, and no photographic image can be developed. It should be noted also that chromatized carbon paper, when dried slowly, is more sensitive than that dried rapidly, so that in the former case it would be difficult to hit upon the right length of exposure.

Most interesting is the circumstance that if a chromo-gelatine film be exposed under a negative, and then replaced in the dark, the parts that have been acted on by light become more rapidly insoluble than those to which the light has not had access. Under-exposed carbon pictures or collotypes gain in intensity in the exposed parts by lying for some days in the dark. Captain Abney's discovery, that carbon paper only requires one fourth of the full time of exposure, when it is afterwards left for fourteen hours in the dark, has received abundant confirmation; by this means splendid effects in carbon prints can be obtained. This after-action of light can be prevented by nothing except by washing out the potassium bichromate.

The phenomenon of older, and therefore hardly soluble, chromo-gelatine being more sensitive than the fresh is held by the author to be generally analogous to a previous exposure in taking negatives. In this latter case the process of reduction is started by an exposure of exceedingly short duration, which, nevertheless, promotes the subsequent and principal action of light in producing an image.

(To be continued.)

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NOTES OF A SKETCHING AND CAMERA TRIP TO SCOTLAND.—No. II.

BY REUBEN MITCHELL.

Being comfortably settled in my room, I had some refreshments, after which I made my arrangements for commencing my artistic operations on the following day. I made up my mind to stay here for the remainder of my time, a fortnight, seeing the locality was so full of beautiful scenery, which would find me employment for a much longer time. About two miles from the hotel is Glen Ample, a charming spot, a tumbling burn and a very beautiful waterfall, surrounded by scrub and large trees, the rocks on each side festooned with ferns and creeping plants, the water flowing into the loch a short distance from the fall. Near to this burn and the loch is a castle of plain appearance, but at present not occupied. A little above the fall there is a most charming picturesque spot which I determined to paint. There was already an artist at work on a large picture. On one day I commenced my sketch of this beautiful place; on the next I finished it.

Glen Ample is a very picturesque place, ever charming at every turn, the burn in its sinuous windings through its rocky bed embowered in fine alder trees which flourish luxuriantly. Here a rough mountain path winds through the glen, varied with patches of grass and heather in full bloom, with the varied mountain peaks on each side; a very charming ramble, which is sure to be repeated if once seen.

After making a sketch of the fall, I next commenced an oil sketch from the head of the loch, one of those sublime scenes never to be forgotten. To survey this scene on a still evening, when the whole of the surrounding objects are reflected in the mirror-like loch, is a grand sight indeed. Numerous cottages of a very primitive character are dotted about the margin of the loch, with patches of corn and potatoes, with here and there a corn rick, all adding colour and beauty to the natural grandeur of the place. The weather was very unsettled, which interfered considerably with my work at times.

From information I received of the beauties of Loch Voil, I determined to go there. About six miles the road is very picturesque. On arriving on the crest of a hill overlooking Loch Voil, I was enchanted with such a grand unusual atmospheric effect. Loch Voil is long, only about half a mile wide, walled in on each side with lofty mountains, one ridge after another. Across the valley from the mountain peaks on each side was a dark, threatening cloud, which caused a deep shadow across the loch and mountains. In the distance, the sunshine and drizzling rain, lighted by the rays of the sun, formed a scene of unusual splendour, the foreground composed of rich corn-fields, trees, and scattered farm buildings.

Leaving here for Glen Buckie, a little further to the west, is a curious river bed, with paths and bridges for the convenience of visitors. The bed of the river divides into several branches, which unite again and flow into the loch below. Such a curious tangled mass of water-worn rocky bed it would be difficult to describe, mingled with trees on the banks and fine tall Scotch firs at intervals. In a flood the scene must be terribly grand. Mizzling rain began to fall, but still I determined to see the glen if possible, and, driving on, I exposed one plate on the river, it raining nearly all the time. Putting up my camera, we still pursued our course up the glen. If the day had been fine it would have been a great treat. The glen is wide and varied in character, but the mist and rain concealed its beauties considerably. Returning, we had a drive about half way along the margin of Loch Voil through fine wooded grounds to a small waterfall, at a farmhouse close by where we stopped to bait the horse.

There are a number of interesting places in connection with Wallace and Rob Roy, but continuing so miserably wet we returned without seeing them, but very well satisfied with the watery trip. Being very anxious to have a sketch of an interior of one of the primitive cottages, I strolled along the margin of Loch Earn. About two miles from the hotel I came on a small village of cottages—a charming place to look at from a short distance—surrounded with cornfields and trees, with the loch in the distance. Coming up to the first cottage, a stalwart Highlander stood at the door. I asked permission to see the interior, but was refused; so bidding him good morning, I walked on to the next. A fine young collie dog coming out barking, brought out a good-natured looking woman; so after quieting the dog I asked her to allow me to see into the cottage, when she at once invited me to come in. The doorway was so low I had to stoop considerably. I was kindly offered a chair. I was very much pleased with the interior; it is primitive in the extreme, but an air of comfort pervaded the room. The fire of peat on the floor with chain and iron hook strong enough to hold a ton weight, but content with an iron tea kettle, a raised stone slab whitewashed, a pair of tongs lying close to the fire; a very wide framework of wood for a chimney, with sundry supports from the floor. My hostess sat in the corner; by her side was an old clock, said to be about one hundred years old; a table, the same age; sundry books in the bottom of the window, which consisted of small panes of glass. At the other corner were a box, a broom, an axe, a saw, and wood tray. The floor was partly mud and partly unedged flags round the fire. A more picturesque scene could hardly be imagined. After considerable hesitation I got permission to make a sketch.

The following morning being wet, after breakfast I started for the village, for the purpose of sketching the interior. My hostess was very kind and chatty, so I commenced and completed my picture, including the old woman with the Bible in her hand. I propose calling it "Sunday Morning in the Highlands." When finished, she was so pleased she asked permission for the neighbours to see it. Of course I at once consented, so in came young and old, and filled the room, making sundry good remarks about the portrait of the old woman, which pleased her amazingly, so bidding them goodbye, I left well satisfied with my primitive interior.

Next morning I made an excursion to Killin for Loch Tay. The road is through Glen Ogle, which commences close to the Loch Earn Head Hotel. It is called the Khyber Pass of Scotland, and is certainly very wild, overhanging crags of dark gloomy appearance presenting themselves at every turn of the road, especially on the east side. There is a small burn runs through the glen, with trees in profusion on its banks. The Highland Railway winds along the west side of the pass, commanding a fine view. The Killin station is at the top of the pass, also a small loch. The village of Killin is a considerable distance in Glen Dochart, the river Dochart flowing through the glen into Loch Tay. The descent from Killin station is serious, and at a considerable decline, which opens up some grand views of the surrounding country. Arriving in the valley, the river Dochart is a considerable one, flowing on sluggishly till it arrives at the Killin village, and close to the bridge; here the river is divided by an island, thickly wooded with fir trees. The river is broken up into a number of rocky ledges, the water leaping from rock to rock in most picturesque confusion, and rushing under the bridge in one united stream towards Loch Tay. The scene from the bridge, looking up the stream, is grand in the extreme; the mountains in the hazy distance, straggling firs, with the stream rushing on, with the wooded island before named, with the converging waters, make up one grand picture. To secure sketches of this fine subject I gave up going on to Loch Tay for some future time, so I sent on my car-man to the hotel, and commenced at once. This subject will form one of the most important of my paintings in my forthcoming exhibition. I also made a sketch of an old corn mill, worked by a water wheel receiving its motive power from the river, a very picturesque spot. Having finished my work, I returned well satisfied with my day's trip. It being a gloomy day, the atmospheric effects on the return journey were very fine, at one time the mountain peaks capped with dark clouds, and at others lighted up with the last rays of the setting sun. Such sublime scenes are only to be seen in mountainous countries.

I decided next to drive round the loch. I started with all my implements, as the weather was very fine, so I made several exposures with the camera, and made some sketches. The village of Ardvich, on the margin of the loch, is a most interesting spot, nestling amongst trees and rich cornfields, backed with the romantic Glen Vich. I took some views here, then pursued my course towards the other end of the loch, along a very pleasant road with many beautiful peeps through the trees across the loch. My carman put up his horse while I strolled about the village, but I was not favourably impressed by its appearance; it converges to a narrow space, which prevents distant views only to the west. There are many villas which give it the appearance of a fashionable watering-place. Leaving St. Fillans, I continued my course round the south side of the loch—a most charming drive, the road being almost covered in with over-hanging trees, with here and there an opening from which fine views of the loch and distant mountains were obtained. Arriving at Glen Ample, a very fine view is here seen of the loch and Glen Ogle in the distance, with the surrounding mountains.

The following morning I occupied myself about the vicinity of the hotel. There is what was at one time the only inn at Loch Earn Head, said to be one of Rob Roy's places of meeting his friends. It is now used for a stable. No one would think it had been a Highland inn, from its plain and unpretending appearance. General Wade had also here an encampment of his army. Loch Earn Head has many associations and legends connected with its history which make it attractive to visitors to the locality.

My time was fast drawing to an end. I made several sketches in water colours of some of the picturesque cottages, with the peaks of Glen Ogle for a background. Several were made in the rain, as the weather was very unsettled.

Next morning I exposed a plate on the hotel; it was raining all the time. At three o'clock I left this most charming place. I shall long remember the kindness of the host and hostess and others in connection with the hotel; I also shall with pleasure remember a gentleman whom accident brought me in contact with, whose kindness and intelligence contributed much to the pleasure of my stay at Loch Earn Head Hotel.

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A SUBSTITUTE FOR PYROXYLIN.*

To the Chemical Manufacturing Company of Berlin belongs the credit of having discovered a means by which the difficulties that at present surround the transport of pyroxylin by rail can be overcome. The above-named well-known Company produces, as a raw material for collodion, a new and peculiar substance which, under the name of "Celloidin," has already been patented in the German Empire. The foundation of this preparation is *celloidin-wool*, a substance which has now for some years been before the public. Celloidin-wool is, as well known, a perfectly pure pyroxylin, which, by a peculiar process of the same Company, is produced quite free from any organic bodies forming compounds with nitric acid, such as dextrin, xyloidin, nitromannite, &c. These compounds are in reality impurities, which have an injurious action on the silver bath. The celloidin itself is obtained in the form of nearly transparent leaves something like the gelatine. It is not explosive, nor even easily combustible; when lighted it burns like paper, and heated in a test-tube it chars slowly. In consequence of these peculiarities it can be sent from one place to another by any convenient means of transport—post, rail, or steam. The greatest advantage that it offers consists, however, in the fact that in a comparatively short space of time we can prepare from these leaves of celloidin a collodion which is prefectly clear and free from sediment, and which is quite ready for use. It is simply necessary to cut the leaves into small pieces, and to dissolve them in any convenient mixture of ether and alcohol. Even with the very best pyroxylin it takes a long time for fining and settling in order to obtain a clear collodion, but the leaves of celloidin dissolve immediately, leaving no sediment, and not even producing cloudiness.

Every leaf of celloidin weighs in gross about 200 grams, and contains, even when in a dry state, accurately 40 grams of pure celloidin wool. To produce a two per cent. collodion a leaf of celloidin must be dissolved in as much ether and alcohol (the proportion of these ingredients may be according to convenience) as will raise the weight of the finished collodion to 2,000 grams; for a three per cent. collodion, 1,333 grams; and for a four per cent. collodion, 1,000 grams. The celloidin dissolves very quickly in the mixture of ether and alcohol, and a collodion of extreme purity is produced—that is, so far as the ether and alcohol are photographically pure; the collodion also, as already explained, is immediately fit for iodizing.

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* *Photographisches Notizen.*

As above mentioned, the gross weight of a single leaf of celloidin may alter in drying, but the effective amount of celloidin wool it contains remains always the same, so that a collodion is produced of a constant degree of concentration.

Correspondence.

SUBTERRANEAN PHOTOGRAPHY.

Sir,—In a recent issue of the News, I notice you make allusion to Subterranean Photography.

When only ordinary hand lamps are used, the light reaching a sensitive plate must necessarily be exceedingly weak, and, although the image may be distinctly visible on the focussing glass, perhaps as distinct as a daylight view generally is, whilst using a lens with a small stop, yet, on account of the colour of the light, or want of actinic power in it, the real value of it in forming an impression is very small, so that supposing even we use a very sensitive plate, yet very much of the success lies in the management of the developer.

In my own experience with artificial light I have noticed that a very small proportion of the pyrogallic acid is the most successful in developing an exceedingly feeble latent image. Thus—

Pyro	¼ grain
Liq. ammonia	4 or 5 drops
Water	1 ounce

will effect, perhaps, that which no other developer will probably do, and bring out the detail where the weakest rays of light have penetrated to the film. I have no hesitation in using double that *ammonia*, however, although I do not think it helps the formation of the image very much; it seems more the reduction in the strength of the pyro which causes the detail to appear. In interior work, with lamps, the high lights are much more exaggerated than with daylight, reflections from conspicuous objects generally coming in the negative up to sufficient density with this small amount of pyro. Should, however, the density not be satisfactory, this developer, which must not be kept on for more than a few seconds, should be replaced by one containing more alkaline pyro, perhaps two grains of pyro per ounce of water; but it should be borne in mind that after this developer has once covered the plate, no more detail can be brought out; the use of it would only be for the purpose of increasing the strength of the image already obtained.

With the second developer, the alkali could with much benefit be the carbonate of ammonia; but the carbonate, I think, should on no account be used at the outset, as the application of the developer last-named—viz., two grains of pyro—and the carbonate would extinguish all except the high lights at once; at all events, the details would be quite suppressed.

With this second developer the saturated solution of carbonate can be used with impunity; ten or twenty drops per ounce will not injure the gelatine, and devotees of dense negatives can revel. I think the chief point to be borne in mind is, that with artificial illumination, all the high-lights being exaggerated, they come up over-dense, and thus, fortunately, enable us to use a developer—viz., very weak pyro—which does not assist density much, but which, in conjunction with strong ammonia, is very active where the light penetrating to the film has been very weak.—I remain, sir, yours &c.,

Charles Bennett.

AN UNCIVIL PHOTOGRAPHER.

Dear Sir,—I was at Burnham in Somesetshire last week. Having exposed all my plates, I asked permission of the photographer in the place to use his dark-room to change my plates. He replied, through some woman who was in the shop, "I never allow any one to enter my dark room."—I am, dear sir, yours truly, R. Gordon.

26, *Norfolk Street, London.*

Proceedings of Societies.

South London Photographic Society.

The first meeting of the session of this Society was held in the lecture room of the Society of Arts, on the evening of Thursday, October 3rd, the Rev. F. F. **Statham** M.A., in the chair. The minutes of the previous meeting having been read and confirmed, Mr. James Willis was elected a member of the Society.

Mr. **Dunmore** read a paper on "Varieties" (see p. 483).

A discussion on inexact nomenclature following on a protest made by Mr. Pearsall against the description of an alkaline bath with an acid reaction.

Mr. **Bolas** said that litmus generally showed a tendency towards a reddish purple tint by artificial light, that light being richer in red than blue rays.

After some desultory conversation on the blistering of albumenized paper,

Mr. **York** read a paper on Experiences in Paris (see p. 484), and exhibited a number of admirable slides of French views on the screen. A transparency from a wet plate, and one from an emulsion plate, were shown alternately; those from emulsion being, in Mr. York's opinion, the best, and the plates most sensitive.

The proceedings concluded with votes of thanks.

Edinburgh Photographic Society.

The monthly ordinary meetings of this Society were resumed on Wednesday evening, the 2nd inst., the chair being occupied by Dr. **Thomson**. In consequence of unavoidable absence of the Secretary, the minutes of the previous meeting were not read, and the business commenced by the admission of Messrs. C. Morrison, D. Grey, — Bell, D. Wilson, J. Rodger, S. Garland, P. F. Patrick, E. Gilbert, William Rae, Thomas Rae, and Dr. Jamieson as ordinary members.

The third item in the billet was a paper by Dr. Nicol: "A Month among American Photographers." He began by saying he regretted that they had not something more practical with which to commence the session, and that although he disliked exceedingly to offer any apology in connection with a public appearance before the Society, he was compelled to do so on this occasion, as the request to prepare the paper had only reached him late on Saturday night, and that he had found it impossible, in the limited time thus placed at his disposal, to do more than look over the notes taken during his recent tour in the States and Canada. He laboured under another difficulty in the fact that those notes had already been pretty fully exhausted for publication in one of the photographic journals, and had doubtless been read by most of those present.

Dr **Nicol** then gave a brief sketch of his visits to one or more of the photographers in the principal towns passed through in a tour from Philadelphia to Flint in Michigan, and exhibited a large collection of photographs collected by the way. Probably the most interesting were several beautiful panoramic pictures printed from various negatives by Mr. Gutekunst, of Philadelphia, and some exquisitely fine specimens of portraiture by the same hand. There was also a large collection of the well-known art studies by Sarony, of New York, which both technically and artistically were little short of perfection. He went on to say that the sum of the observations that he had made was that the American "skylights," as a rule, were really skylights, as side lights were, on the whole, little used, and that the best results he had seen, including most of those he had shown, were produced without the aid of screens or blinds, the artist trusting almost altogether, for the desired distribution of light and shade, to the position of his sitter relative to the top light, which he preferred to employ; and further, that notwithstanding the much-envied brilliant atmosphere, and other circumstances supposed to be so favourable to the practice of photography, the photographers of England and Scotland had nothing to fear in a fair competition in the matter of portraiture, at least, as, if probably half a dozen of the best men were excepted, the work in the United States was on the whole inferior to that generally met with here. With regard to landscape work it was somewhat different, so far, at least, as the amateur was concerned. He was inclined to think that American amateurs stood higher than their European brethern; they were probably less numerous, but more enthusiastic, and, in spite of the high pressure at which commerce generally was wrought, they had more leisure, and leisure of more photographic value, because of the greater prevalence of brilliantly fine weather. He concluded by saying that everywhere he went he met with a most hearty reception, and found that American photographers generally showed a deep interest in the photographic sayings and doings of the old country.

Dr. THOMSON said that he was sure the members present had listened with much interest to the observations made by Dr. Nicol, and he would be glad to hear a general expression of opinion on any of the matters touched on. The question of the relative proportion of top and side-light was one of considerable difficulty, and one which every photographer must settle for himself. Generally speaking, a man would succeed best with that with which he was most accustomed, and very fine work might be done with either or both.

Mr. W. NEILSON, in moving a vote of thanks to Dr. Nicol, said he did not altogether sympathise with the favourable opinion expressed regarding plain backgrounds in preference to pictorial or artistic embellishments Both, he thought, were best, as when a photographer had to photograph an interesting and beautiful subject, the sitter required no adventitious aid; but where the model was neither interesting nor good-looking, it was better to make a picture of the background, bringing in the figure merely as an accessory.

Mr. DOBBIE, while thanking Dr. Nicol for the interesting resume of his tour, thought the Society should guard itself against endorsing the statement that American portraiture was inferior to that in this country. Dr. Nicol had only been able to overtake a limited portion of the States, and he knew there were many cities in which high class work was done, that he had not visited.

Dr. NICOL quite agreed with the observations of Mr. Dobbie, and of course wished it to be thoroughly understood that what he stated was simply his own opinion, founded on what he had seen in the limited portion of the country he had visited. On the motion of Mr. Dobbie, a vote of thanks was given to Dr. Thomson, and the meeting adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management held their usual meeting on October 2, at 160A, Aldersgate Street.

The minutes of previous meetings were read and confirmed.

The following gentlemen were duly elected as ordinary members of the Association:—Messrs C. Tear, R. Prewet, and W. T. Wilkinson.

An application for relief was then entertained and after full consideration, the Board granted the necessary order to meet the applicant's case.

After other minor business had been dealt with, the meeting adjourned till November 6th, at 8 p.m.

Talk in the Studio.

A NEW BACKGROUND FABRIC.—We have received, from Messrs. Avery and Co., examples of "Empire Patent Opaque Cloth," a fabric which seems especially well suited for use in photographic background screens. It is of thin firm texture, and perfectly flat or dull in surface. There are various tints in brown, greys, greens, &c., which would serve well for plain backgrounds. Some admirably varied effects may be produced by working on the surface with crayons, a capital tooth for the chalk being presented. With a little artistic skill, sketchy landscapes and architectural effects may be made to diversify the plain background. We certainly commend a trial of the material.

PHOTO-MECHANICAL PROCESSES.—Captain Waterhouse's able article on photo-mechanical and other permanent printing processes as applied to producing maps, to which we have recently drawn attention, appears in the *Journal of the Asiatic Society of Bengal*, Part II, No. II, Volume XLVII, 1878, and is published in this country by Messrs. Trubner and Co. Our publishers will obtain it for readers of the NEWS who may wish to order the treatise.

To Correspondents.

IGNORAMUS.—We do not remember the address of any photographer on the Italian side of the Alps.

J. A. B.—We have published in the NEWS and YEAR-BOOKS many recipes for producing retouching surfaces. Many photographers prefer to apply a coating of weak gum water, before the negative is dried after fixing and washing. The surface of the gum takes lead pencil readily, and the negative is varnished after retouching. A good surface for the pencil is produced by using a weak, thin, spirit varnish. This dries not quite glossy, and bites the pencil. If a thick spirit varnish have been used, a little powdered resin rubbed over the surface with the end of the finger answers well, and possesses the advantage of application in such parts as most require retouching without being applied all over. The tannin retouching medium is a trade preparation supplied by Mr. Burrows. We do not know its constitution, but have heard it highly spoken.

DRY PLATE WORKER.—The plates in question have the reputation of being rapid; but, judging from results in the exhibition, they are scarcely equal in excellence to some others. You will find details in Captain Abney's book on emulsions just published.

E. BENTHIN.—The formula of your gilding solution is the usual one, sometimes with the addition of a little chloride of sodium (common salt). It requires care in mixing. As we mentioned last week, it is better to get the eye accustomed to the right colour by the light of the dark room, and to lift the plate right from the box, instead of using the mirror. At least, this was our practice, and it answered well. We generally used the mixture of bromine and lime called (not quite accurately) bromide of lime. Sometimes we prepared it ourselves, but generally purchased a French article sold in wide-mouth bottles labelled "bromure de chaux." When this worked slowly, and seemed exhausted, we refreshed by adding a little bromine. The method you suggest for preparing plates would not give, we fear, a sufficiently solid coating of silver to bear cleaning. The best plates we could get were made by Scovil and Co. in America. These had been coated by the battery. Do not hesitate to ask any specific questions. We shall have pleasure in answering, and shall be glad to hear of your success.

A. BORLAND.—We have posted the letter. Captain Waterhouse's treatise on the photo-mechanical process, &c., is published in the *Journal of the Asiatic Society of Bengal*, Part ii. No. ii., Vol. xlvii., published in London by Trubner. Our publisher can obtain it for you. We shall be pleased to receive a communication for our next YEAR-BOOK from you.

S. C. STRAKER.—Captain Waterhouse's paper mentioned above contains some excellent information; you will find a very good practical article on the subject in our YEAR-BOOK for 1867. There are many methods of placing a photographic image on wood for engraving; but none better than making a photo-lithographic transfer, and placing it on the surface of the wood as though it were stone.

NORTHMAN.—There is no process that we have heard of which will give silver prints on plain paper possessing as much vigour and richness of tone as those on albumenized paper, otherwise it is probable that albumenized paper would never have acquired the universal application that it has. There is no better method of producing enlargements than the plan of producing an enlarged negative, and printing from it. For colouring in crayons, use prints produced on drawing paper. You will find an article on the best mode of so printing in our YEAR-BOOK for 1875. We have not space in this column for fully repeating details of processes.

G. D.—We have understood that white hard varnish diluted with an equal bulk of spirit makes a very good negative varnish; and we do not think that any after danger is to be anticipated.

H. LORD.—The group is very good

A. E. (Shepherd's Bush).—You can probably obtain lessons in retouching in the evening, from Mr. F. T. Burrows, 11, Milton Street, Dorset Square.

J. M. D.—The exhibition will remain open for a month. The awards have been made.

J. E. BLISS.—We do not know who the photographer was who took portraits of the survivors of the ill-fated *Captain*.

Several Correspondents in our next.

The Photographic News, October 18, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Phototype Printing—Signalling by Sun Rays—Bichromate and Gelatine versus Varnish—A New Method of Estimating Silver—Transfer Paper.

Phototype Printing.—In our contemporary, *Nature*, last week, is a full page illustration produced by Dallastint, which deserves something more than a passing notice. It is, we believe, the first time that a phototype of this size has ever appeared by way of illustration in an ordinary periodical. The print represents a somewhat complicated barometer, and it is impossible to see how the same object could have been rendered photographically and printed by any other process than that of Mr. Dallas. Woodburytype would doubtless have rendered a cleaner image, and Lichtdruck or collotype also; but in neither of these cases would it have been possible to have printed letter-press beside it, and at the same time. In the case of this Dallas print, it is part and parcel of the journal itself, and although the sheet upon which it stands is perceptibly glazed, this has probably been done in the printing, since the paper is employed in other parts. We do not wish to imply that this Dallastint is perfect, but it is pretty certain that no other photo-mechanical process would have given the same result under the same conditions. It fulfils, though not in a very perfect degree, the conditions under which a photo-mechanical process will be of the greatest value. What is desired is to be able to take a photograph direct from nature, and to convert that photograph into a printing block which can be printed off in a press beside ordinary type. There are several photo-mechanical processes whereby phototypes can be produced; but in all these cases the original object photographed is in black-and-white. In the Dallastype, however, there are half-tones, in the form of fine grains, produced by printers' ink, as well as type of very minute dimensions. Whether Mr. Dallas can still further improve his process remains to be seen; but in the case of many reproductions it falls very little short of perfection. One of his great difficulties has been to secure a paper with a sufficiently fine surface to take the delicate markings of the blocks, a difficulty shared in by the producers of Lichtdruck in Germany. In that country, photo-mechanical printers sometimes employed a faced paper prepared with chalk and size; but this Mr. Dallas is probably debarred from doing, because the printer would find it unsuitable for his letter-press.

Signalling by Sun Rays.—According to the *New York Daily Graphic*, a tribe of Indians, recently captured by the United States troops, employ light rays for the purpose of guiding their movements in warfare. Their name is the Nez Percés, and their chief is provided with a looking-glass "used to direct military manœuvres in battles by means of reflected rays of light." The nature of the signals and their significations "have never yet been found out by the white man," but the orders, we are told, are apparently "conveyed to distant parts of the field by a system somewhat similar to the dashes and dots of the Morse telegraphic code." In this country we do employ the Morse signals for telegraphing with lanterns at night, showing a light for a brief time to indicate a dot, and for a longer period to signify a dash, and by dashes and dots one can make up the whole of the alphabet. A dot alone signifies E, the letter most used in the alphabet, while a dash means T; a dot and dash signifies A, while two dots followed by a dash is W, and so on. It is but a few years ago that our military authorities were considering the introduction of a means of day signalling based upon the use of the mirror. When the sun shone, it is said signals of this nature could be flashed enormous distances, and, moreover, they could only be seen by persons placed at a proper angle for watching the signals. Probably the Indians employ the mirror for making a few important signals only to indicate the approach of an enemy, or to direct their forces in what direction to move. Any one who has once seen the intense light reflected by houses at sundown, when the sun's rays appear like a burning spot, can well imagine how useful a mirror might be made for signalling, and we have it on very good authority that when Admiral Sheriff was in command at Gibraltar, some forty years ago, he was in the habit of communicating with a friend across the Straits who lived at Tangiers. The Admiral employed for the purpose a single toilet looking-glass, which was so placed to reflect the light at the proper angle, and in this way he telegraphed to his correspondent on the African main. It would be exceedingly interesting to learn the code employed by the Nez Percés Indians in making use of sun rays to communicate to one another, but, according to the *New York Graphic*, there is very little prospect of our ever being able to do so.

Bichromate and Gelatine v. Varnish.—An employment has been suggested for the use of bichromate and gelatine—or, rather, size—which should not be unimportant. It is that of using the mixture upon walls in all sorts of houses or buildings. A certain proportion of bichromate of potash is mixed with the sizing, and this applied in the ordinary manner with a brush. Gradually the light acts upon the bichromate mixture, and an insoluble compound is formed which refuses to wash away, and is impervious to damp. Probably, in many cases of varnishing, the same mixture might be employed—where, for instance, the yellow tint is of no importance. Many varnishes are as yellow in their character as bichromate and gelatine, and there would be few cases in which the latter could not be substituted, provided, of course, it answered equally well. The usual method of varnishing a paper surface is to first coat it with size, and, when this is perfectly dry, to apply copal or some similar varnish. But if bichromate were added to the size in the first instance, there seems no reason why the simpler mode should not be just as effective; it would certainly be cheaper, and entail less labour.

A New Method of Estimating Silver.—Herr Volhard, in *Liebig's Annalen*, points out a method of estimating silver in solutions by the aid of ammonium thiocyanate, dilute standard solutions of which will remain unaltered in strength for years in closed bottles. He cites ready methods for determining silver when present alone, or with other metals in solution, and also when in combination with chlorine, iodine, and bromine. To the photographic chemist, therefore, Herr Volhard's communication has much that is interesting, and as the paper is rather too long for insertion here, we may refer to a very good abstract in English which appeared in the *Journal of the Chemical Society* for last month.

Transfer Paper.—As photographers are beginning to make experiments with papers of their own choosing for transferring carbon prints, it may be well to warn them against finely glazed white papers, of which there are plenty in the market. Some of these are very unsuitable to their purpose, for the opaque whiteness is frequently due to zinc or lead white. The burning of a sheet of paper will soon show how much mineral matter of one kind or another the paper contains, but the mere fact that a material is highly loaded in this way does not of itself prove that the surface thereof will discolour. To subject the paper, when moist, to a stream of sulphuretted hydrogen is a much better test, and, if it will bear this experience, the atmosphere of our towns and cities will do little harm. As regards discolouration from long exposure to light, this is sometimes due as much to the nature of the transfer material applied as to the paper itself, it must be borne in mind.

PRESS NOTICES OF THE PHOTOGRAPHIC EXHIBITION.

(*From the* Daily News).

The photographs are numerous, and in most instances of a high class. Among the exhibitors of this year, who number about 100, are to be found some of the best landscape photographers, both professional and amateur. In fact, the Exhibition may be said to shine especially in landscape photography, which, together with landscape art, appears to have taken the first place in England, while the supremacy both in drawing and of photography of the figure have remained with the Continent. There are not a few examples, however, of figure photography which show a high order of merit. There are in the room many photographs of well-known personages, which in their clearness of outline, and also their softness and delicacy of shading, would be by no means contemptible beside some of the best results obtained in Vienna, St. Petersburg, or Paris. Some of the most noteworthy examples are in enlargements, albeit the enlargements are held to be purely mechanical effects, and are not highly esteemed on that account in the photographic world. It cannot fail to be interesting to see what the small negative does in reality produce when the picture is transferred to a larger plate. The fidelity with which every minute detail is reflected is strikingly shown when the enlarging process is gone through, and no better example can be found than the comparison of some of the large photographs of animals with the small ones printed from the original negative. Some very excellent specimens of enlargements of portraits are to be seen in the portraits of Mrs. Langtry, Mr. Hook, R.A., Mr. Henry Irving, and Mr. H. J. Byron. It is in landscape, nevertheless, that the great merit of the Exhibition lies. Many very beautiful photographs are here to be seen which have been taken with the wet plate, but it is being admitted that this must eventually cede its position to the emulsion or dry plate; and, indeed, if any one needed actual proof of the superiority of the new process, it would be found in the exquisite photographs which have been produced by it. One important advantage connected with the dry plate is its capacity for use. An idea of this may be gained from the fact that one of the conditions for the prize of £50 offered by Mr. James Paget for a dry plate process is that sensitive films made by it shall remain without perceptible change for not less than four months after preparation, and must keep satisfactory for three months in any climate between exposure and development. The advantage in results can be seen by the examples at the Exhibition, especially in regard to the faithful idea of interval and the exact delineation of objects at a distance. It would, however, be unfair to the older process, which has served its purpose so long and so well, unduly to praise the other at its expense, particularly in face of the very fine photographs it has produced, which are to be seen in profusion at the Exhibition. In addition to the pictures which are sent for competition, and which form the Exhibition proper, is a curious and interesting collection of photographs collected by Mr. L. Warnerke in the leading establishments of Sweden and Russia, and lent by him to the Council of the Society. These, in addition to illustrating phases of Russian and Swedish life, throw some light upon foreign processes of photography, and are well worthy of examination.

(*From the* Standard).

The display of landscapes was admirable; but the portraits, as usual, fell short of the excellence of results attained by the photographers who have devoted themselves to scenery. There was an exception, however, in the three exquisite pictures by Mr. Hemery, representing the ages of innocence, wisdom, and of beauty. Of instantaneous effects there were some excellent sea pictures by Mr. Payne Jennings. The very large landscapes of Mr. Vernon Heath and of the Autotype Company maintain in every way the well-earned reputation which both have long enjoyed, and the views of St. Owen and the cathedral at Rouen are most illustrious specimens of the value of such architectural records. The applications of photography to ceramic were by Mr. Watson, and the transparencies of the Sciopticon Company deserve both notice and praise. The stereoscopic views of the Paris Exhibition by Messrs. Murray and Heath are perfection for such scenic effects. The contributions of the School of Military Engineering take no mean rank in the present collection, where they are brought into direct competition with the works of such eminent artists as Mr Bedford and Mr. England. The landscapes, too, of Mr. Conway and Mr. Dunmore are particularly noticeable for their brightness and artistic character.

(*From the* Morning Advertiser.)

The members and their friends assembled in such numbers as to make the inspection of the various works a matter of some difficulty. The Exhibition is, perhaps, not the best that has been held by the Photographic Society. It presents, however, notwithstanding the absence, as exhibitors, of two or three of the leading members, features of more than ordinary interest, inasmuch as some of those who have hitherto ranked as second or third-rate artists have boldly come to the front, and taken a position that, gratifying as it may be to themselves, must at the same time tend to elevate the Society and the art which they practise. In the field of landscape, British photographers have no rivals. They have made it their own, having out-distanced their Continental *confreres* just as our landscape painters have excelled, and, as a rule, triumphed over those of all foreign countries. There is, too, a noticeable advance this year in landscape photography, the dry-plate process telling with excellent effect on the artistic value of the work produced. Formerly, in transcribing the beauties of natural scenery, the success of photography was partial and varying. Sometimes a foreground would be the acme of perfection, daylight and truth meeting with a clear dawn, but distant objects, so completely amenable to the painter, would be slurred and blurred, or it might be the reverse—a clear distance and a blotchy foreground; but with the dry-plate work each part of the picture bears its due and proper relation in gradation and tint to the whole. This is an improvement which, like many other developments of this beautiful art, has been brought about by gradual steps. It is none the less marked, however, and in nearly the whole of the landscapes exhibited in Pall Mall we may behold "the bright countenance of truth" depicted in studies of delightful freshness. Amongst the finest specimens are those by Mr. William Bedford, of 326, Camden Road; but, owing to the fact that his father was one of the jurors, they were not entered for competition. Mr. Payne Jennings, West Dulwich, is another contributor whose works are entitled to the highest praise. A frame of views in Ireland, by Mr. Jennings, are exquisite specimens of the art. Mr. Vernon Heath has been awarded a medal for a frame of four views in the Isle of Skye, the famous Scour-na-Gillian having as much attraction for the photographer as for the painter. In these views Nature's own cunning hand, assisted by the magic of the camera, is unmistakably present. Bits of rock, jagged, broken, shapeless, lying in chaotic confusion, backed up by a weird towering eminence, sublimely and magnificently grand, stand out with delightful, almost startling, reality, exciting the imagination and leading it perforce from nature to the contemplation of nature's God. This is the province of pure art, its highest aim; and in these views—snatches of Nature, in her most evanescent mood—Mr. Vernon Heath has exalted the art of which he is so accomplished an exponent. The sea studies, instantaneous effects, by Mr. Payne Jennings, are also worthy of the highest commendation—rather, however, for the beauty and naturalness of the clouds than for the restless motion of the waves. There are many views of the Paris Exhibition and its adjuncts by Mr. William England, St. James's Square, Notting Hill, and views in Kent and North Wales by Mr. Edward Dunmore. Amongst the portraits and figure subjects, although there are some excellent examples, there is no marked advance on previous exhibitions. It would almost seem that in this domain the art was at a standstill, and admitted of no improvements; but in these days of scientific discovery it would be unwise to hazard such an opinion, and on a matter of this kind we cannot venture to speak "ex cathedra." In applying strong "chairoscuro" to portraiture, Mr. R. Slingsby, of Lincoln, has already won his laurels. His two examples, "Satisfaction," and the Portrait of a Lady, are deep in tint without heaviness, and the lights are soft and natural without abruptness. There is commendable delicacy in the work of Mr. T. G. Hemery, Peckham, and the perfection of monochromatic art in the opal enlargements by Messrs. R. Faulkner and Co., Baker Street, Portman Square. In portraiture pure and simple, Mons. A. Boucher, King's Road, Brighton, and Messrs. Lombardi and Co., Brighton and Pall-mall East, hold a foremost place, their productions being essentially lifelike and graceful. Mr. A. W. Wilson, De Beauvoir Road, Kingsland, is the exhibitor of a frame containing illustrative photographs of "The Seven Ages of Man," very excellent; and Mr. H. Garrett Cocking, High Road, Lee, son of the esteemed assistant secretary, sends four character studies, of which the most difficult, and at the same time most meritorious, is a scene from "The Husband in Clover," the grouping of the two figures, as well as the general arrangement of the accessories, being cleverly managed. Miss Rose Hersee, as Elvira, in the "Rose of Castile," is a work of merit; and, as regards La Gitana, it would clearly be unfair not to award the praise between the artist and the sitter. Mr. Harry Pointer, Brighton, contributes a number of instantaneous photographs from life, principally of domestic pets, in all kinds of peaceful and warlike attitudes, the whole forming an amusing collection. The Woodbury Company and the Antotype Company are, as usual, exhibitors of their enlargements, which are now so well known; and the School of Military Engineering, Woolwich, are large contributors of landscape scenery. Last year the views taken by the Arctic Expedition under Sir George Nares formed a special feature of the Exhibition. This year, also, there is a special feature, and one that is likely to be rather popular. Mr. L. Warnerke, Peckham Rye, a photographer of repute and an inventive genius, who has been honoured by foreign societies of a cognate character, has been to St. Petersburg, where he was instrumental in founding a photographic society. In his travels he also visited Sweden, and during his foreign sojounrings he naturally made many friends. An evidence of this is afforded by a loan collection of photographs given to him by the leading establishments in Sweden and Russia, which are exhibited on the screens, and will well repay examination. They are chiefly Russian, illustrative of every phase of society there, from that of the palace of the Emperor to the cottage of the peasant. Mr. W. Carrick, an English miniature painter settled in St. Petersburg, becomes an exhibitor, through Mr. Warnerke, of pictures of Russian life, embracing no fewer than 192 studies of character, and for these the Society has awarded him a medal. Mr. Carrick is also represented by a series of views taken in various parts of Russia. Several processes are exhibited by Mr. G. Scamoni, head of the Photographic Department of the Imperial State Paper Manufactory, St. Petersburg, and by Mr. Sapteff, of the War Department. Coloured photography is not admissible to the Society's Gallery, and, therefore, it happens that the new process called poikilographic painting, for reproducing oil paintings, invented and patented by Messrs. Lombardi and Co., is relegated to a rather bad light on the staircase. The five examples of this beautiful art are, with one exception, copies from the old masters, and the very texture of the originals is reproduced. The process is equally applicable to studies from the life. A negative is taken in the usual way, then enlarged on thin translucent paper or canvas, and the colours—mineral colours only being used—are applied on the reverse side, and show through the surface. The effect, which is very wonderful, is infinitively superior to anything produced by the oleographic or chromo-lithographic processes. As large works can be reproduced with the same fidelity as small ones, there can be little doubt that poikilography will play an important part in the dissemination of exact *facsimiles* of the great masterpieces of art.

(*From* The Times).

In spite of the discoveries in the production of artificial light, which threaten to work a revolution in photogeny, the past year has been distinguished by no sensational developments in photography. The most interesting, perhaps, of the methods illustrated at the Photographic Exhibition is that by which a near approach to photographing in colours is secured. The Lombardi Art Company have applied with novel care and skill a method of representing colours which is called poikilography. A photograph in monochrome is enlarged from a negative in the usual way, and transferred to thin paper or canvas. Colours are laid on by the hand on the reversed side, and show through. The colours may be roughly applied, and are without shading. The most delicate shades are supplied by the photograph. The effect of paintings by Rubens, Holbein, and other old masters is admirably reproduced. A portrait from life (of Miss Curwen) taken according to this method appears to be pleasing so far as the very bad position given to the picture on the stairs enables it to be judged. This situation is allotted to the picture because the rules of the Society exclude hand colouring from the rooms of the show. The time, perhaps, will come when photographs in colours will be produced wholly by natural means. The prismatic spectrum has been reproduced on the Daguerreotype plate, and also on specially prepared paper, in colours which approached the original, although they were wanting both in truth and fixity. In the meanwhile such approximations as those of the Lombardi Art Company, or M. Vidal's variously coloured gelatine films, are to be welcomed.

The points most to be noticed in the methods of plain photography are the increasing use of dry plates, and the advantages gained by the processes of enlargement which the Autotype and Woodbury workshops have brought to perfection. A small photograph can be taken much more rapidly than a large one; and speed is obviously desirable in dealing with cloud and wave as well as with the mobile faces and attitudes of living beings. The exhibition is full of examples of large pictures with unlimited wealth of detail produced from negatives in which the naked eye discerns only coarse masses of black or brown. The Society has adopted the practice of giving medals for the objects exhibited. The jury was composed of Mr. Poynter, R.A., Mr. John Brett, Mr. James Glaisber, F.R.S., Messrs. F. Bedford, H. P. Robinson, E. Piercy, and H. White. The medal for the best landscape has been adjudged to the School of Military Engineering, Chatham. As it is in landscape that the exhibition, in common with English photography in general, is peculiarly successful, the honour is the greater for the students of this military school, who are usually employed in photographing machinery, guns, and military positions, and only in their holiday time take the beautiful scenes such as that near Bettws, which has won for them the medal this year. The medal for the best series of landscapes is awarded to Mr. Vernon Heath. The views thus distinguished comprise the hills of Skye—Blaven, from Loch Hart of Corrie; Marscow, from the Red Burn; Blaven, from Scour-na-Gillian, from the Red Burn, studies of stone-heaped fells with mountains in the background. In these a great difficulty of the photographer has been overcome. The distance and the foreground are rendered with equal success. The figure study distinguished with a medal by the judges is one of a series of enlarged illustrations to Shakspeare's Seven Ages in "As You Like It." It is the figure of the Justice, "with eyes severe and beard of formal cut," by Mr. A. W. Wilson. The *genre* picture selected for a medal is "The Broken Leg," a dog with his leg bandaged—the subject of the anxious solicitude of a little girl. The photographer who succeeded in obtaining quietude from these difficult subjects is Mr. George Nesbitt, of Bournemouth. The Woodbury Company gain the medal for the best photomechanical prints. By their remarkable process the thin films which form the light and shade of a photograph are pressed into a metal slab, which is thus excavated into an engraving block. The book illustrations shown for the medal are perfect in delicacy and distinctness of linear engraving. The medal for apparatus has been won by the well-known firm of Marion and Co. They exhibit Cadett's patent pneumatic photographic shutter. The object of this invention is to open and close rapidly access to the lens while the operator engages the attention of, for instance, a child who is being photographed. The photographer has merely to press an elastic ball like the handle of a pneumatic bell, and the pressure is conveyed by a slender india-rubber tube to the instrument. A little cap is by this means rapidly raised or lowered. The pneumatic apparatus is much more portable than its competitors worked by electricity. Additional medals were placed at the disposal of the judges for any novelty, or other form of excellence, in process or result. One of these was given to Mr. Payne Jennings for instantaneous effects in pictures of yachts in full sail upon the sea. The camera in these views comes as near to representing motion as is possible. In the four hundred entries catalogued (many of them series of objects) there is much of interest besides the pictures or instruments for which medals are awarded. Mr. Warnerke has lent a large collection of Russian and Swedish photographs. Many of these were taken by the State establishments of the Russian Empire, and some are remarkable illustrations of the processes known as heliogravure, hyalotype, &c. There are several fine portraits in the exhibition, but as specimens of pure photography some of the best were disqualified for the medal by having been improved by hand. M. Faulkner's work is peculiarly soft and pleasing. He transfers a photograph to opal glass and completes it with sepia. The portraits of Mrs. Alfred Morrison and of Miss Bertha Ellis are particularly noticeable. The portraits taken by M. Boucher should not be overlooked. Mr. Dixon's representations of the heroes of the Zoological Gardens, the views on Loch Morah taken by Mr. W. J. A. Grant, of Arctic fame. Mr England's valuable series of plates recording the buildings erected for a year on the slops of the Trocadéro and and on the Champ de Mars, Captain Abney's photographs of the Swiss Alps and the Welsh hills, Mr. H. Garrett Cocking's "Gitana" and other character sketches are among the many good pictures of the show. Messrs. Wratten and Wainwright's photographs, from negatives taken by the instantaneous gelatine plate exposure, will be interesting to photographers as examples of the increasing use of the dry-plate method. Mr. Bennett sends a transparency taken on a winter's night by candle light and lamplight. The subject was entirely in still-life, and an hour's exposure explains the perfection of the picture. Ceramic photography has made less progress than could have been desired, but some pretty applications of photography to cups and saucers are to be found in the Exhibition.

(*From* Funny Folks.)

As usual, the Annual Exhibition of the Photographic Society was inaugurated by a soiree, at which "photographs" and "society" were both fully represented. Some visitors, indeed, saw more of the latter than the former, so crowded was the gathering; whilst the exclamation, "Ah, mon *camerade!*" funnily applied by one photographer to another early in the evening, was heard on all sides of the rooms at 5a, Pall Mall East (except the outside) until a late hour. Some consternation was caused amongst a party of strangers who chanced to hear a knot of artists discussing the "dry plate" process, lest dry glasses should also be usual at a photographic soirée; but they were shortly reassured on this point. Amongst the best of the portraits on the walls was that of Hook, R.A., by which, not unnaturally, one's Eye was soon caught, and that of a Mrs. Langtry, whose face it seems to us we have a vague recollection of having seen before somewhere or other during the past year. Mr. Irving, whom we have seen look very well in several parts, looked well here as a whole, in his portrait; and the same remark applies to Mr. Byron. "Ver-non" *semper viret* Heath seems at all events to be perennial, judging by his excellent works; whilst Mr. Edward Dunmore's landscapes tempt us to say that if he had "Dun-less" he could not have done them better. Mr. W. Carrick, now "russticating" at St. Petersburg, sends a collection, not of "Carrickatures," as one might have expected, but a series of pictures of life *a la Russe.* We have only to add a suggestion for next year, which is this: That at the next soirée the tea and coffee should be handed round by a number of pages (the pages of a number would be about enough) kindly lent by the Editor of the Photographic News.

ALBUMEN PORCELAIN PROCESS.

BY GEORGE W. SCHELL.*

To albumenize the porcelain plates, take the whites of a half-dozen eggs, or enough to make exactly six ounces of albumen. Add—

Water	4 ounces
Fine table salt	20 grains
Liquid ammonia	30 drops

Now beat the above until not only stiff, but until it is thoroughly crumby. This should be done in the evening, and set aside in the dark room over night, well covered. It is a well-known fact that albumen cannot be filtered as clear and free from dust, and small organic fibres, which are held in the albumen, as if left to remain standing for several hours to settle. It seems that the froth holds the organic matter, and allows the free albumen to settle to the bottom of the dish almost as clear as crystal. The albumen having been allowed to settle, it will be found that the froth on top has clung together, forming a complete protection from dust for the settled albumen underneath.

The clean albumen is now decanted into a clean graduate (the froth portion will remain clinging to the edges), and at the same time skim the clear albumen, as it is decanted, into the graduate, and it is now ready for use. The porcelain plates should be put into the acid dish for several hours, according to the strength of the acid, then well washed, rinsed and hung up to dry. Now take a small piece of canton flannel, and saturate with alcohol; moisten the surface of the plate with the alcoholic flannel, quickly following with a dry piece of canton flannel, and rub until dry; it is not necessary that it should be polished (this is done for the purpose of making the albumen flow freely and evenly). Now brush off the plate well with a camel's-hair duster, and wet the tip end of the fingers and thumb with your tongue, and lay the plate, back down, on the tips. This is done to keep the plate from slipping off the fingers. Now pour on enough albumen to cover the plate; when covered, allow the bulk to run towards the upper end of the plate, then quickly tilt the plate towards the bottom, so that the albumen will run off evenly at the bottom. Now allow the plate to fall back to its former position on the finger-ends, at the same time catching it by the lower left-hand corner, almost level, then hold it over the gas-burner, allowing the upper end of the plate raised a little higher than the lower end, and keep it moving right and left in circles, so that it will commence drying at the upper edge of the plate and dry downwards. As soon as the plate commences to steam at the top, it must be caught at the top right-hand corner (with a piece of clean paper doubled up between the thumb and forefinger, to keep from burning them), and tilted almost perpendicular, at the same time keeping it moving as above stated, so that it will keep on drying evenly from the top down to the bottom of the plate.

This manner of albumenizing the plates is to procure an evenly albumenized plate, being the same thickness of albumen all through. These plate must be kept in a thoroughly dry room, and free from dust. The writer generally albumenizes several dozen at once of the different sizes, and keeps them on hand, as they are better when old, and will keep for a year and more; in fact, freshly prepared plates do not work as well as the older ones, and the albumen has not had time to harden thoroughly.

Your plates now being ready for use, proceed to make up the following:—

Silver nitrate	1,200 grains
Water	4 ounces

Dissolve the silver in the water, take out one-third, and set aside; add concentrated ammonia to the remaining two thirds, which will, of course, turn chocolate colour keep on adding until clear; now add the one-third to the two-thirds. Now add nitric acid until almost acid, but still neutral. It will be observed that you commenced with a little better than four-ounce silver solution; by pouring into the graduate, you will find that it has doubled itself, that is, you have a prepared silver solution of eight ounces; this can be used until it is entirely used up. Filter, and it is ready for use. Now take your plate by the lower left-hand corner, thick end down, and flow on your silver in the same manner as when you develop a negative so as to cover the plate entirely, occasionally adding a little more silver solution. Keep moving around the plate about three minutes, then let run off, and drain into the dish previously placed underneath the hand and plate to catch the silver. Now hold the plate level, and pour on a little alcohol at the upper right-hand corner, allowing it to flow to the upper left-hand corner, and then evenly down to the bottom of the plate, quickly wiping the fingers, and catching the right-hand corner between the thumb and forefinger, at the same time holding the plate perpendicular, in order to allow the alcohol to drive the superfluous silver before it; let drain. Now pour on alcohol same as before, but let it run from corner to corner around the plate three times; then grasp the plate in the same manner as previous, and let drain. Wipe off the drops of the lower corners, and hold over the gas, face towards the heat, and dry, commencing at the top of the plate, and drying towards the bottom, which it will do quickly; then hang up in the fuming-box, and fume from five to eight minutes, and your plate is glossy and evenly prepared for printing. In printing, it should print a rich sepia, but should only be printed a shade deeper than the regular paper print.

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* *Philadelphia Photographer.*

Tone in the toning-bath used for albumen prints, but carry the tone a little further than you would prints that have been salted previous to toning. The porcelain print is merely washed under the tap a few minutes, and then placed in the toning dish and toned. Soda them in the same soda as used for paper prints, letting them remain for five to eight minutes. Wash in running water same length of time as paper prints. I usually wash both porcelains and paper prints about three hours, hang them up, and let them dry spontaneously.

THE OXALATE OF POTASH DEVELOPER.

Referring to some remarks on this subject at the June meeting of the Photographic Section of the American Institute, Mr. H. J. Newton says:—"As reported, I am made to say what I did not mean to say, and when the minutes were read at the next meeting, called attention to the inaccuracy of the report, especially that part which made me use the term 'ferrous neutral oxalate of potash,' and supposed the correction had been properly made until I saw it in the printed report. It will be observed, by reference to several previous reports of the monthly meetings of the Section, that what I said on the subject, referred to at this time was, to a certain extent, connected with previous statements of my experiments and formulæ for its preparation, and would be better understood in such connection than taken alone. However, to dispel the fog, and make clear my formula for compounding this new developer, I will give it in detail:—

Hot water	16 ounces
Commercial carbonate potash ...	3 ,,

When dissolved, add commercial oxalic acid in crystals until the solution is neutral. Care must be taken not to add the acid too fast, as the carbonic acid evolved would cause the overflow of the liquid. When it is neutral, it can be acidified either with oxalic or citric acid. I am inclined to the opinion that the citric acid gives the best intensity. When it is to be used to develop, take a small quantity, and add fifteen to twenty grains of finely pulverized protosulphate of iron to the ounce, and when it is dissolved it is ready for use. I would not recommend the adding of the iron to a large quantity than would be used in one day. It should be sufficiently acid to turn litmus paper red.

"In compounding the developer, I have used chemically pure salts, but find no advantage in so doing, while the expense is increased more than six times. The iron developer in common use has many impurities, and so far as I know there is no chemically pure iron for sale by stockdealers; and, from my experience, no advantage would be gained by its use if there were. When Mr. Willis gave me this developer, he requested me to try it and experiment with it. The first time I used it Mr. Willis mixed it, and the ferrous oxalate employed was furnished by him. The impression which I got from my conversation with Mr. Willis was that he did not consider it fully developed, and that it was capable of improvement. He stated that he had very little time or opportunity to experiment with it. He also informed me that a gentleman in Paris (a very extensive dry-plate worker) to whom he had given it, had worked it with the most gratifying results, and that he had given it to several amateur photographers in England.

"The next time I saw Mr. Willis I told him that the neutral oxalate of potash in the market here would cost two dollars a pound, which would be a serious objection to its general use. He told me that the commercial salts of oxalic acid and carbonate of potash would answer every purpose, and said the cheapest form of the potash salts (pearlash) would answer. I tried pearlash in my experiments, but the results were not satisfactory."

SPIRIT PHOTOGRAPHY.

In his correspondence in our Philadelphia contemporary, Professor Stebbing, speaking of so-called spirit photography, says:—

"Is it the influence of foreigners into this gay, frivolous, and if not unbelieving, at least heedless city, that spiritism has come into favour here? Believers and unbelievers are springing up like mushrooms.

"The only thing that I am acquainted with, and which interests photography, is this. One of my customers for dry plates, a very rich and respected gentleman, assured me upon his honour, that he was able at the present time to take portraits of spirits in his private room, the room being completely darkened, and not a vestige of light to be seen. As he employed but my dry plates, I was certain that no trickery could take place, and pressing him with questions, he told me that by the aid of the medium the spirit was evoked, and that the portrait was obtained in the dark with two seconds of exposure. I then begged him to show me some of the negatives that he had been able to obtain. Three weeks last Sunday he brought me about a dozen negatives. Only two were sharp; the others were in all shapes and forms. The one, the portrait of a very fine young woman, about the age of thirty to thirty-five, beautiful in form, of the appearance of a *chef-d'œuvre* of a great sculptor; it could be taken for the reproduction of such a statue by a non-observer, but upon serious examination it was easy to discover that it was not the reproduction of a marble or plaster cast. The hair was flowing down her back in profuse locks, even to her very knees. I put the negative under microscopic power, in order to trace whether the hair was natural, by its tubular conformation or otherwise; want of sharpness prevented this. The feet were out of focus, and altogether the portrait had the appearance of the old painting of the Immaculate Conception, in which we see the Virgin, as it were, rising upwards towards heaven; in fact, nothing indecent about the whole negative. I took a positive by transparence of this negative, and it has excited the wonder of the many who have seen it. The other negative was that of a very old man, an ancient sea-robber, so it appears according to statement. His beard was prodigiously long, hanging down nearly to his feet. The other negatives were very confused, as it appears the spirits have no little difficulty not only to keep together, but also in the focus of the lens of the camera; some appear, as it were, floating in the air; others without their heads, others dislocated, and some without a certain form; in fact, without being a believer, it may be said to be strange and unnatural.

"Now for the anti-spiritism. A gentleman named Mr. Cazeneuve gave a lecture at the Sorbonne on prestidigitation, in which he gave experimental proofs that there is nothing marvellous or supernatural in the phenomena said to be produced by spirits. He says to the spirits or their mediums, "Whatever you do, I will do it without requiring darkness, and at the same time I defy you to do what I do." (I wish not to speak against spiritism, for, in my opinion, it is better to believe in spirits than in nothing at all; but let us seek for truth, and if photography can be brought into play, and spirits are willing to sit for their portraits, or, as they say, 'that the Almighty, seeing the wickedness of the present generation, permits them to make certain manifestations in order to draw mankind from error,' there is a truthful medium called into action, and in whose 'mouth there is no lie.'"

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THE PHOTOGRAPHIC EXHIBITION.

II.

In visiting the Photographic Exhibition a second time, we are struck with the amount of excellent work, but we are also painfully struck with the impression how much of it is on a dead level. There is no really bad work; but there is nothing super-excellent, nothing which becomes a centre of attraction, and is admitted by common consent as distinctly an advance in scientific or artistic excellence. Rumour whispers that if the artistic element in the jury had borne absolute sway, more medals would have been withheld than have been. Eleven medals for definite subjects, and others at the discretion of the judges, were offered, whilst seven only have been awarded. Here we must correct an omission. In our last, we did not mention Mr. Nesbitt, of Bournemouth, as having received a medal. We are glad to say he worthily gains the medal for the best *genre* picture. The subject is entitled "The Broken Leg;" the patient being a magnificent mastiff, whose bandaged leg proclaims his misfortune. A little child, who has installed herself as nurse, is caressing the huge recumbent animal. As a picture it is simple and natural in arrangement, and excellent in composition and light and shade, whilst it possesses the highest photographic excellence in roundness, modelling, delicacy, and force. The two medals for the best pictures or series of pictures in the Exhibition are not awarded, no surpassing excellence being apparent to the Judges. The medal for the best landscape, or series of landscapes, was, as we last week announced, awarded to the Military School of Engineering at Chatham. In a conversation with the late head of the School, Captain Abney, he pointed out that if the award had been made to an individual, as the jury wished, an injustice would have been done, as the School really work together with perfect co-ordination. The second landscape medal was given to Mr. Vernon Heath, for a frame of four "Hills of Skye." The medal offered for portraiture, the best portrait or series of portraits, was withheld. In portraiture the Exhibition is certainly poor, no advance of any kind being manifest. There are many good ordinary specimen room examples, retouched to an extraordinary degree of prettiness, but little beyond this. The medal for the best single figure study was awarded to Mr. A. W. Wilson for one figure—the *Justice*—in his series representing Shakespere's description of the Seven Ages of Man. Two medals for photo-mechanical pictures were offered; but, strange to say, nothing new in this direction was exhibited. One medal only was awarded, and that to an old process, which has already worthily received many medals—the Woodbury process. Where was Mr. Dallas? Where was Captain Abney, who has done good work in this direction? Where was Mr. Warnerke, also a successful experimentalist? Where are many more who have worked successfully in this direction? We recently saw some examples, produced by Mr. Henschel, a German gentleman resident in London, so perfect that we thought the secret of *photogravure* was discovered. But there are no specimens at the Exhibition. A medal was offered for micro-photographs; but none are sent! The medal for apparatus was worthily given to Mr. Cadett's pneumatic shutter. We should have liked to have seen one also given for the very ingenious electric shutter, exhibited by Mr. Cussons, invented by Mr. Cowan; and one would not have been ill-bestowed on Mr. Hare's revolving cabinets, although, if we remember rightly, they have had a previous medal. They merit more.

Of course it is to the general interest of good workers that medals should not be too common: where all are decorated, where is the distinction? The story, variously told—of the English diplomat who, at a grand Continental levee, appeared in simple unadorned evening costume amongst all the ambassadors of Europe, almost weighed down with stars and orders, was described by one of themselves as at once the most decorated and distinguished in the room, by his simple absence of display—is worth remembering at any time where medals risk becoming too plentiful. On this occasion there appears to have been no risk.

Turning from the question of excellence in the Exhibition to the means whereby the pictures were produced, we find the study very interesting. The time is past when the majority of the pictures were distinguished as being taken by some marvellous lens: the only distinction of the kind is found in intimation that the picture was produced on So-and-So's tissue! But of real interest is the intimation in numerous cases, in which we learn that the negative was produced on a dry plate. In the present Exhibition a very large number of pictures have been produced on dry plates, and not a few of these are by emulsion processes.

Some of the finest landscapes, as well as some very fine portraits, are distinguished as the result of emulsion processes. Foremost in excellence amongst these are the contributions of Mr. Henry Cooper, who sends many examples of the collodio-bromide process, in which the plates were kept long, both before and after exposure. These pictures equal, if they do not excel, anything exhibited in the present display. Take his series Nos. 52 to 58 as examples, which, for delicacy and richness, perfect atmosphere, and admirable brilliancy, are unsurpassed. The skilful pictorial selection and artistic treatment throughout is a large element in the success; but the technical perfection tells also for very much. Close by these are a series of landscapes by Mr. Seymour Conway on plates by Canon Beechy's process, which as admirably bear testimony to the excellence of the process and the artistic skill of the artist, the series consisting in half-a-dozen fine views in and about Tunbridge Wells. The triumphs of dry plates are as great in portraiture. Messrs. Wratten and Wainwright exhibit a portrait of a young lady taken with one-fourth of the exposure necessary for a wet plate, the plate being prepared with a gelatine emulsion. In delicacy, texture, and modelling, the picture is in every way perfect. Mr. T. G. Hemery exhibits a charming portrait of a little child illustrating the Age of Innocence, in which the negative was produced by the aid of Warnerke's emulsion. It is in all respects equal to a very high-class wet plate picture. Singularly delicate and well modelled, it suggests no lack of exposure, but, on the contrary, fulness. Mr. Hemery's picture is one of a set of three, the Age of Wisdom and the Age of Beauty forming the remainder of the series—the second being the fine, dignified head of an elderly man, and the third that of a charmingly beautiful woman with much sweetness of expression. They are printed on opal, and form a charming series.

We must return to dry plates in our next, having exhausted our space for the present.

THE GOLD TONING BATH.

We have more than once taken occasion to point out the tendency to a growth amongst photographers of misleading and inaccurate terminology. At a recent meeting of the South London Photographic Society, Mr. Pearsall took occasion to enter a protest against the tendency, and point out its mischiefs. The opportunity was, however, scarcely a fair one, as it arose out of a suggestion in Mr. Dunmore's paper, containing various practical suggestions, in which he pointed out that the "so-called alkaline bath" worked better if it showed a slightly acid reaction when tested with litmus paper. The term *alkaline gold toning bath* does not necessarily designate a bath with an alkaline reaction. It came into use as a distinguishing term from the old hypo. toning bath, which was a curious conglomeration of almost anything which would liberate sulphur from hyposulphite of soda, and cause sulphur toning on the prints. The new toning bath consisted of chloride of gold to which a trace of an alkaline or neutral salt was added, sufficient to disturb the feeble combination in which the gold was held with chlorine to bring about a readiness to deposition upon the silver print, and so produce toning effect. It should be well understood, however, that in no case is it desirable that the gold bath should have an alkaline reaction. If sufficient of an alkali be added to the solution of chloride of gold to decompose the salt, all toning conditions are destroyed. In one of the most popular toning baths, that known as the *acetate* bath, a neutral salt (acetate of soda) is added to the gold solution, which stands a day or two before use. A slight decomposition takes place in which any trace of free hydrochloric acid in the gold salt is neutralized, and acetic acid set free, whilst the gold and chlorine are left feebly united in a tottering state of equilibrium, the gold being ready to fall at the slightest inducement. The chlorine is also ready to join the soda; or, if any free nitrate be present, to unite with the silver. The free acetic acid is also a reducing agent, and helps the deposition of gold; hence all the conditions of toning are brought into operation. Some years ago Mr. Bovey, in his able series of papers on printing and toning, pointed out, in our pages, that a gold toning bath should have a slightly acid reaction, and described one of the simplest and most efficient that could be made. It practically consisted of chloride of gold well diluted with hot water. Unfortunately, there is strong proclivity amongst many photographers towards complications, and they easily accept any empirical mess which ignorance and pretence may place before them. It is well to remember that in the majority of instances simplicity brings not only safety, but success.

FRENCH CORRESPONDENCE.

Awards and Prizeholders in the French Photographic Section of the International Exhibition.

The Executive Council of the International Exhibition still refuses to make known the official list of awards; and, as regards the French exhibitors, at all events, we have only general report to go by. But if one can trust the information which appears to have leaked out, the gold medals will be awarded as follows in the French section. Gold medals are adjudged for the second time to M. Garnier and M. Mathieu-Deroche, and eleven medals to MM. Goupil, Rousselon, Braun, Dujardin, Gillot, Levy, Lumiére, Victoire, Valery, Nadar, Leon Vidal, and Quinzac. A brief account of the characteristics and works of these prizeholders will, I think, be of interest to the readers of the Photographic News, and I shall be glad to note here what I know concerning each of them.

M. Garnier, who was formerly in partnership with M. Salomon, was one of the first of those who turned their attention to converting photographic negatives into engraved plates. One process, indeed, which he patented some twenty years ago, gave rise to a lawsuit between himself and M. Poitevin. It is now some time since M. Garnier has handed over the working of his method to M. Dujardin, of whom I shall have to say something presently.

It will not be necessary to inform my readers that M. Goupil is the principal publisher of art works in this country; still less to describe the performances of M. Rousselon, the director of the immense establishment of which M. Goupil is the founder and proprietor. All who read these lines not only know his name, but (at least those of them who have been to Paris) have paid a visit to the workshops at Asniéres, where, under the charge of M. Rousselon, photography is carried on on so vast a scale, and with such remarkable success.

M. Mathieu-Deroche is more especially noted for his photographic enamels. Scarcely had Poitevin and Lafon de Carmarsac demonstrated the possibility of obtaining prints on enamel, than M. Mathieu-Deroche distinguished himself by the production of works of this kind of a remarkable degree of perfection. The success which rewarded his efforts induced him to quit Nice, where he was engaged in business as a portrait photographer, and to establish himself in Paris, where public favour continues to follow him.

Braun, of Dornach, whose loss photography has this year had to deplore, has left a name so well and universally known, that it will be scarcely necessary to dilate on merits that are unanimously admitted.

M. Dujardin is, as I have above stated, the successor of M. Garnier, and has acquired great skill in working out the process patented by his predecessor.

M. Gillot is a very young man, who carries on with much judgment and success the work of his father, the inventor of a process that, under the name of Gillotype, has contributed greatly to the dissemination of works of art. Thanks to this process, by which photographic reproductions can be converted into printing plates, illustrated publications have been enabled to derive immense advantage from our art.

In succeeding to the business of MM. Ferrier and Souliè, M. Levy has maintained himself in the first rank of stereoscopic photographers; by his energy and talent he has greatly enriched the numerous and beautiful collections that his predecessors had formed on their travels. Just now, M. Lévy has published an album under the title of *Souvenir de l'Exposition Universelle de* 1878, containing choice and varied selections of views taken in the Champ de Mars and the Trocadéro.

M. Lumière (of Lyons) ranks with justice among the first portrait photographers of France

M. Victoire (of Lyons) is also one of those artists who are always found in the front rank of progress. He is the head of an establishment which could be taken as a model even in Paris.

Count Ostrorog, who, some years ago, made his *debut* as a photographer at Marseilles under the name of Valery, has acquired under this pseudonym a reputation that has been fully confirmed in Paris.

As regards Nadar, who has been in turn medical student, humorous writer, caricaturist of the first order, and fearless aeronaut, he is too much an artist not to become a photographer of extraordinary merit as soon as he took to working with the sun.

M. Leon Vidal also possesses one of those natures that photography must of necessity attract and make captive. He has devoted the best part of his life to the development and advancement of the art. Nearly twenty years ago he founded the Photographic Society of Marseilles, and afterwards devoted himself to an exhaustive study of all the processes that have been made public; he turned his attention more especially to carbon photography, to the improvement of which he greatly contributed, and afterwards to photo-printing in fatty inks. More recently he has brought out a process which he calls *Photochromie*, and which is now being worked largely and successfully on an industrial scale.

Of M. Quinzac I know scarcely anything, except that he lives at Toulouse, and that he exhibits in the Champ de Mars a fine collection of impressions in fatty inks.

In examining this list, which I have every reason to believe will be found to agree with the official list when it is published, it will at once be conceded that the prizes are only commensurate with the merits of those to whom they are adjudged, but there is room for regret that it does not contain the names of others whose claim to receive the notice of the jurors was nearly equally well established. As regards the award of the Grand Prize and to the Honourable Mentions, I am not yet in a position to make any announcement. Ernest Lacan.

PHOTO-COLLOTYPE.

BY CAPTAIN WATERHOUSE, B.SC.[*]

About a year after the publication of Albert's method, Mr. Ernest Edwards, of London, introduced, under the name of "Heliotype," a very important modification of the photo-collotype process. He first waxed a glass plate, and then coated it with a substantial layer of gelatine and bichromate of potash containing a small quantity of chrome alum, with the object of hardening the gelatine and rendering it insoluble, without destroying its impermeability to water. When dry, the gelatine film was removed from the waxed glass plate, and the side which had been next to the glass was exposed under a reversed negative in the usual way, and then, as in Albert's process, the back surface of the film was hardened by exposure to light. After this, the film was attached under water to a metal plate (preferably pewter) coated with india-rubber, and "squeegeed" into perfect contact with it. The bichromate salt was then removed by washing, and the plate was ready to be printed in an ordinary Albion printing press.

In this process the peculiarities were the use of chrome alum for hardening the gelatine; the separation of the colloid film from its original support, by which perfect contact with the negative was secured, as well as less risk of breakage of the latter; the subsequent transference of the film to a metal plate, by which the liability to breakage of glass plates in the progress of printing was obviated; and, lastly, the substitution of vertical instead of scraping pressure in printing, by which the gelatine films were not exposed to injury by wear and scraping of the surface. This process is still, I believe, largely practised, and full details of it, with various improvements suggested by Capt. Abney, R.E., will be found in the latter's excellent little work, "Instruction in Photography."

About the same time, Herr Obernetter, of Munich, proposed another process of the same kind offering some peculiarities, and said to produce very satisfactory results.

A sheet of glass is coated with a mixture of gelatine, albumen, sugar, and bichromate of potash, dried, and exposed to light under a negative. The plate is then dusted over with finely-powdered zinc, which attaches itself only to the parts protected from the light, and in proportion to the amount of protection they have received. The plate is then heated to about 369° F., or exposed to light till the whole surface of the film has been rendered insoluble. Before printing, the plates are treated with dilute muriatic or sulphuric acid. By this operation the parts of the gelatine film covered with zinc are rendered, by the formation of hygrogen, susceptible of attracting water to a greater or less degree, while the other portions, upon which no zinc has settled, are capable of receiving a fatty ink. The printing is then proceeded with in the usual manner.[†]

Since 1869, when these processes first began to come into practical use, many methods of working have been introduced, chiefly in Germany and France; but, so far as known, they are nearly all of them more or less modifications of one or other of the above, merely differing in the manner of preparing and hardening the gelatine film. A good deal of information on the subject will be found in Husnik's *Gesammtgebiet des Lichtdrucks*, Geymet's *Phototypie*, Moock's *Traite Pratique d'Impressions Photographiques aux Encres Grasses*, and A. Martin's *Handbuch der Emailphotographie und der Phototypie oder des Lichtdruckes.*

The great difference between the photo-collotype processes and lithography is, that whereas the lithographic stone receives a like quantity of ink in all parts of the image, and is incapable of producing a true and continuous gradation of shade, the moist gelatine film possesses the valuable property, not possessed by the stone, of receiving a greater or less amount of ink in different parts of the image, in exact proportion to the intensity of the action of the light upon them, and is thus capable of reproducing the most delicate gradations of shade as perfectly as they are shown in an ordinary silver print.

It will thus be readily understood that instead of the advantages of photographic reproduction by cheap and speedy mechanical processes being confined to the reproduction of certain special subjects, they can be extended to all classes of subjects, such as photographs from nature, brush-shaded and coloured maps, MS. records, drawings and paintings of all kinds. Even for line subjects, the process surpasses most of the known processes of photo-engraving, photo-zincography, or photo-lithography in the delicacy, sharpness, and clearness with which the finest lines can be reproduced, as well as in perfect accuracy of scale, owing to there being no intermediate process of transfer, with its attendant washings and pressings, and the plate being printed by vertical pressure.

The process has the further advantage that the prints do not require mounting, and this makes it very suitable for book illustration, for which, indeed, it is now being very largely used. It is especially valuable for illustrations of a scientific character in cases where otherwise only the highest class of lithography or engraving would be applicable, and at an enormously increased expense.

For the most successful application of the photo-collotype processes to the reproduction of maps, the result depends, as in photo-zincography, very much on the quality of the negative, and that again on the original.

Any negative that will give a good photographic print will answer, but the successful reproduction of shaded maps or drawings demands considerable care in the execution of the original drawing, as well as in taking the negative. The precautions to be taken in these respects have already been indicated in Sections II. and III.

For some years past my attention has been given to the utilisation of this valuable process for the reproduction of maps and other photographic work which the Surveyor-General's Office is called upon to do for various Government departments. In the Proceedings of the Society for November 1871, I described a process which I had found to answer well for line work, and strenuous efforts were made to bring this and other methods into practical working. Is is much to be regretted that, owing to the many difficulties met with in manipulating the gelatine films in the hot damp climate of Calcutta, and in getting printers with the special artistic skill required to produce the best results, our efforts have not been quite successful, and, as photo-zincography is found more convenient for most of the work passing through the office, the photo-collotype process has not been brought into general use.

(To be continued.)

A SUBSTITUTE FOR PORCELAIN DISHES.

BY C. J. M.

I can't remember if I have seen anything published suggesting the method described below, for making photographic dishes—whether some kind friend gave me the hint, or whether "necessity" was in my case "the mother of invention;" but being for a short time in Australia, and not caring to go to the expense of porcelain, knowing that on my return to India they would run the risk of not too careful handling *en route*, I cast about for some substitute, cheap, and at the same time not so liable to break.

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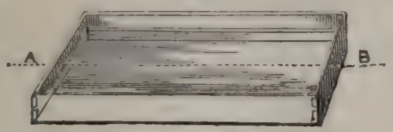
[*] Continued from page 488.

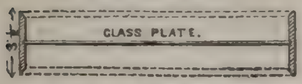
[†] Photographic News, Vol. XIII. p. 488.

I had wooden frames made the size of the dishes I required, with a groove running all round the inside mid-way between top and bottom, in which was inserted a sheet of glass before the frame was closed, which gave me two dishes for each frame. I marked on the outside what solution each was for, had the glass cemented with putty, and coated the frames inside and out with shellac varnish made by dissolving shellac in methylated spirit; the first coats sink into the wood (pine), so that it took at least five or six coats before I was satisfied; the result was all I could wish. Two of the dishes I took to India, and have since brought them home with safety, and they have never leaked, nor have I found any bad effects from the putty, even with nitrate of silver solution, which I have often had for days in the dish.

DISH.



SECTION ON A B.



Thickness of Frams ¾in.

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Correspondence.

PHOTOGRAPHIC EXAMINATIONS.

Dear Sir,—I see in your issue of 20th Sept. you have been good enough to draw attention to the Society of Arts' examination in the technology of photography. I fear, however, from the short space you are able to spare in reference to it, that some misconception may occur both as to the class of candidates to whom the examination is open, as well as the special nature of the examination. I venture to send you two cuttings from the Programme as follows. There is no other restriction or condition on the candidate.

The following gives the general nature of the examination.

1. In order to pass these examinations it is essential that the candidate (who must be actually engaged in the special branch of industry in which he desires to be examined) should possess, in the first place, such an elementary knowledge, at least, of abstract science as will enable him thoroughly to understand the scientific principles of which his art or manufacture is an application; and, in the second place, such a knowledge of the application of those principles in his trade as will show that he is practically conversant with the various processes and manipulations of the factory or workshop. The theoretical knowledge must not be a mere "cram" of empirical dicta; nor the practical knowledge a mere committal to memory of descriptions of manufactures picked up from text-books.

Part II.—Technology.

5. The characteristic properties of pyroxyline for the manufacture of collodion and the various substances employed for the purpose, as well as the solvents, such as ether, alcohol, wood naphtha, &c. Different qualities of collodion.

6. The various processes, both wet and dry, including the Daguerreotype; and the principles involved in each. Emulsions both with collodion and gelatine, paper processes, developers, acid and alkaline, intensifiers, &c.

7. Processes for portrait work, landscape work, copying pictures, maps, engravings, and documents of all kinds. Printing in silver, and other metals, in carbon, Woodbury-type, vitrified enamels; toning, and fixing.

8. Special applications of photography to engraving, typography, photo-lithography, including the various processes for collotype, &c.

9. Special applications of photography to astronomical and microscopical purposes, as well as for recording meteorological and other observations.

10 Lenses and the various purposes for which they are specially adapted. The construction of cameras, and other apparatus, &c.

Part III.—Practical Knowledge.

11. The candidate must forward to the Society of Arts a certificate, on a form supplied (see par. XI.), certified by his employer, stating the nature of his employment in a photographic establishment, and showing that he is practically conversant with at least one branch of the art. He may also be required to send specimens of his work.

The requirements in science and arts to be testified by the candidates holding certificates of having passed the Government examination in certain special subjects were, fully given in your journal; I therefore do not repeat them Candidates desirous of further particulars can be supplied with them on application to the Society of Arts.—Yours faithfully, P. Le Neve Foster.

[The references to these examinations in September 20th were prepared hastily, to catch the press, by an assistant when we were from home. On October the 4th we gave, much fuller particulars; but we have pleasure in inserting Mr. Foster's note, as further calling attention to the subject.—Ed.]

ANOTHER UNCIVIL PHOTOGRAPHER.

Dear Sir,—Mr. Gordon is not singular in having met with an uncivil photographer. Early in the month of September I was staying for a few days at Dover, and, like Mr. Gordon, having exposed all my plates, I asked permission of a photographer, &c., in Snargate Street, to use his dark-room to change my plates. He replied, "Certainly not."

In contrast to this I went to Mr. Grossmith's, the first studio in Dover, and Mrs. Grossmith, in the absence of her husband, at once, without the slightest hesitation, placed a dark-room at my disposal.—I am, dear sir, yours truly,

York Hill, Loughton. C. G. Cutchey.

RED FOG AT WINCHESTER.

Dear Sir,—Having been from home, I have only just noticed an article in the News of August 30th on red fog during intensification. I have had very little experience of this defect; but, on one occasion, was very much bothered, and as it seems to have arisen from some cause not alluded to by you, I will describe the circumstances. I was at work on the banks of the river a little below the city of Winchester, using the river-water, which is there a tolerably large and rapid stream, such as one might suppose would not be readily affected by anything accidentally thrown in. All my negatives fogged badly in the shadows when I attempted to intensity them. Nothing I tried would cure it, and I came to the conclusion that there must be some impurity in the water. Neither on that day nor on any other occasion, before or since (at least for many years), have I been troubled by the same defect. I do not know what means there may be at or above Winchester for defiling the river. I fancied at the time that perhaps some paper mills might be engaged just then in washing out the antichlor, but the notion seems rather far-fetched, nor do I know anything of the sewage arrangements. Perhaps one of your Winchester subscribers can give some information.

I did not use water from the same source at any other time, so I cannot tell if it was a permanent or only a temporary and accidental defect; but of the fact that it was caused by the water I can have scarcely any doubt.

Norbiton, October 8th. Russell Sedgfield.

MEDAL TO THE PHOTOGRAPHIC SCHOOL OF ROYAL ENGINEERS.

Dear Sir,—From what I can gather from your leader of last week, I am forced to believe that the jury who awarded the medals at the Photographic Exhibition have stepped beyond their proper functions. In the conditions of competition I see nothing regarding the jury awarding a medal to an *individual*, but simply that it is to determine which *pictures* merit recognition; at this point I presume their functions cease.

The Council of the Society, also, as far as I can see, have no right to call for the name of the producer of a picture if he wishes to exhibit anonymously, unless something fraudulent is suspected.

The Photographic School of the Royal Engineers has this year, as in others, thought it advisable to exhibit under what I may call a corporate name, and as they have been awarded a medal, I cannot see why it should be called upon to designate the producer of a particular picture (which, by-the-bye, I should say, from my previous connection with the School, it would be impossible to do), any more than any firm, who in former years have obtained medals, should be called upon to give the name of any particular operator that it may please to employ.

I need scarcely say that I am delighted to see that the picture in question has been awarded a medal, and I simply write in order to oppose a demand which is inconvenient, unnecessary, and which under no circumstances should be acceded to.—Yours faithfully,

W. de W. Abney, Capt. R.E.

CLOTTING IN EMULSION.

Sir,—"Enthusiast" has repeatedly tried the dry-plate process given by "Photo-Chemicus" in the Year-Book for 1876, and always failed, the result being a clotted solution more like milk that has got sour then a hopeful agent for a successful film.

As "Enthusiast" is very keen to succeed with this process, she would feel very grateful if "Photo-Chemicus" would kindly say at what heat the silver should be added to the bromide solutions, as all seems to go well up to that point.

"Enthusiast" has hitherto solved the nitrate in the alcohol by putting the bottle containing it in hot water. Perhaps it requires more heat, and if so, how is it applied?

"Enthusiast" has tried Anthony's gun-cotton in another sample.

Rocklow, Fethard, Clonmel, Oct. 9.

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Proceedings of Societies.

Belgian Photographic Association—Section of Brussels.

At the meeting of the 1st June last a paper was read by M. de Pitteurs "On the Extraordinary Intensity Obtained with Collodion by the Direct Addition of *Nitro-Glucose*, and on the Advantageous Use of the same Substance in Preparing Bromide Emulsions with Pyroxyline of a Low Temperature."

M. de Pitteurs drew attention to the circumstance that a collodion made from pyroxyline that has been prepared at a high temperature gives negatives of much greater intensity than one made of cotton intensified at a low temperature. He explained this as being due to the fact that when a high temperature is allowed to prevail in preparing pyroxyline, there is formed, in addition to *nitro-cellulose*, another body, *nitro-glucose*, to the presence of which latter substance he ascribes the intensification in the collodion. This view is also held by Hardwich, while Dr. Van Monckhoven is of opinion that it is not the nitro-glucose, but a product resulting from its decomposition, which acts as the intensifier. From the difficulty experienced in procuring pyroxyline prepared at a high temperature, M. de Pitteurs was induced to try whether the addition of nitro-glucose to collodion made from cotton that had been nitrified at a low temperature would not have the same effect, and with most satisfactory results. As its name implies, nitro-glucose belongs to a numerous family of compounds possessing more or less explosive properties, of which some, like nitro-cellulose or pyroxyline, nitro-glycerine, and nitrobenzine, are well known. All these bodies are formed, according to the *substitution theory*, by the action of nitric acid on an organic substance, that action consisting in the replacement of one or more atoms of hydrogen by an equivalent quantity of molecules of hypo-nitric acid. Thus the conversion of cotton into photographic pyroxyline takes place according to the terms of the following equation:—

$$\overbrace{C^6H^{10}O^5}^{\text{Cellulose}} + \overbrace{2NHO^3}^{\text{Nitric acid}} = \overbrace{C^6H^8(NO^2)^2O^5}^{\text{Pyroxyline}} + \overbrace{2H^2O}^{\text{Water}}$$

Reasoning from analogy, M. de Pitteurs assumes that nitro-glucose has the formula $C^6H^9(NO^2)^3HO^6$ since that of glucose is $C^6H^{12}O^6$. The substance itself he prepares in a similar way to proxyline. He takes one part fuming nitric acid of 1·5 specific gravity, with from one to two parts sulphuric acid of 1·842 specific gravity, or 66° Baume. The mixture of the two is reduced in temperature until the latter reaches from 10° to 15° C., and then ordinary powdered loaf sugar is added by teaspoonfuls, and the liquid kept well stirred with a glass rod. Under the action of the acid the sugar takes the form of gelatinous lumps or clots, which remain suspended in the liquid, or adhere to the sides of the vessel. It is not easy to ascertain the proportion of sugar that a given quantity of acid can convert into nitro-glucose, as it greatly depends on the extent to which the acid mixture can be cooled. According to some authorities, one part of sugar may be used with three or four parts of acid, but M. de Pitteurs is of opinion that no more sugar should be added when, in consequence of the formation of water, the temperature rises to 30° C. Although the conversion of the sugar into nitro-glucose takes place very rapidly, it is better to allow the action of the acid to continue for four or five minutes; after which, the whole mixture is poured into a large porcelain beaker containing water. Nitro-glucose, being insoluble in water, settles at the bottom, or adheres to the sides of this vessel, and the supernatant liquid is drawn off; more water is then poured in, the pasty mass is stirred with a glass rod, and the liquid again decanted, and this operation is repeated until the whole of the nitro-glucose is collected at the bottom of the beaker. On account of the viscidity of the substance the process of washing is tedious and troublesome; it greatly resembles that of collecting and rolling butter, except that, in place of the hand, a pestle is employed to knead the gelatinous mass, the water being continually changed until it ceases to redden blue litmus paper. Finally, the mass is thoroughly washed with distilled water; and the washing is continued as long as a few drops of the wash-water give a precipitate in a solution of silver nitrate. Nitro-glucose prepared in this way is a white sticky mass, which can be drawn out into silky threads; it has neither taste nor smell. Like glucose, it acts on polarized light, turning the plane of polarization to the right. It is insoluble in water, but soluble in ether or alcohol; one part nitro-glucose takes from seven to eight parts alcohol of 96° to dissolve it completely at ordinary temperatures. An alcoholic solution of silver nitrate, when added to a similar solution of nitro-glucose, renders it turbid, producing a white precipitate, which turns brown when exposed to the light, and deposits a black powder of reduced silver. M. de Pitteurs keeps his nitro-glucose in bottles with ground glass stoppers. The most important point for the photographer, however, is how to employ this substance with collodion. According to M. de Pitteurs' experiments, he obtains negatives of extraordinary intensity by adding—

Nitro-glucose...	1 part
Pyroxyline	5 parts

prepared at a low temperature; in fact, the intensity is so great that the dose of nitro-glucose may in many cases be reduced with advantage. When the proportion of pyroxyline in a collodion, and also that of nitro-glucose in its alcoholic solution, are known, it is easy by calculation to find the number of c.c. of alcoholic solution which correspond to one gramme of nitro-glucose. Thus, supposing we have 27·5 grammes of nitro-glucose dissolved in 245 c.c. of alcohol. To find how much alcohol contains one gramme of nitro-glucose, we have the proportion—

$$27{\cdot}5 : 1 = 245 : x$$
$$\text{or } x = 8{\cdot}9 \text{ c.c.}$$

Again, if we want to know the quantity of nitro-glucose required to be added to 100 grammes of 2·5 per cent. collodion, since the proportion of nitro-glucose to pyroxyline is as 1 : 5—we have

$$5 : 2{\cdot}5 :: 1 : x$$
$$\text{whence } x = {\cdot}5 \text{ grammes nitro-glucose.}$$

To translate this weight of nitro-glucose into quantity of alcoholic solution we have

$$1 : {\cdot}5 = 8{\cdot}9 : x$$
$$\text{therefore } x = 4{\cdot}5 \text{ c.c.}$$

or, in other words, 4·5 c.c. of alcoholic solution of nitro-glucose must be added to 100 c.c. of 2·5 per cent. collodion. The solution is added to the collodion by small quantities at a time, and the flask containing it is kept well shaken. It is important to observe that emulsions to which nitro-glucose has been added, like those made with pyroxyline prepared at a high temperature, require a smaller proportion of *aqua regia* to give the same excess of free silver nitrate as in emulsions containing no nitro-glucose. This circumstance M. de Pitteurs explains by supposing that the combination of silver nitrate with nitro-glucose is closer than is generally supposed, and that it is not destroyed —at least, immediately—by *aqua regia*. Besides acting as an intensifier, nitro-glucose confers on freshly-made emulsions the properties generally due to age, such as greater sensitiveness, a capability of giving sharper details in the shadows, and a power of developing more rapidly, and less subject to veiling. M. de Pitteurs submitted to the notice of the meeting several negatives confirming his views as to the advantage of using nitro-glucose with collodion.

Dr. van Monckhoven expressed himself as struck with the great practical importance of M. de Pitteurs' method; at the same time, as he himself had for many years experimented with large quantities of nitro-glucose, and had found the products that he had obtained to be very variable, he thought M. de Pitteurs ought to describe very closely and accurately his process in order that others might obtain the same results. The speaker had frequently observed that the addition of silver-nitrate to a fresh solution of nitro-glucose did not at once produce a precipitate while with old solutions the precipitate was immediate; bu possibly his solution was not sufficiently concentrated. He w of opinion that no nitro compound would combine directly with silver-nitrate, and that attributing great influence to temperature in the preparation of pyroxylin was erroneous; the differences that had been noticed were probably due to the presence of resinous bodies in the cotton, for he had observed that when the cotton wool had been well washed in soda, it gave the same results when converted into pyroxylin either at a high or a low temperature. In the dry processes a very resinous pyroxylin gave great intensity. Dr. van Manckhoven also inquired whether M. de Pitteurs could say what was the colour of the film of silver-bromide on the plate when viewed by transmitted light.

M. de Pitteurs replied that he had made no special observation on this point, but he believed the colour to be orange.

Dr. van Monckhoven observed that it would be highly interesting to try whether the plate is sensitive to the red or orange of the solar spectrum.

M. Rommelaere stated that he proposed to make experiments in photo-spectroscopy, and to repeat some of the important ones of Captain Abney.

Dr. van Monckhoven called attention to the latest experiments of Abney, Vogel, and others, according to the results of which we could not be far from a process that would enable us to obtain plates sensitive to the green. A great service would thus be rendered to landscape-photograpers, as well as to those who were engaged in reproducing pictures; for if the plates can be made sensitive to the green they would probably be so also to the red and yellow, and we should no longer be subject to an inherent defect of all our present processes, namely, that dark colours like blue and indigo became light, while light colours like yellow and red turned out dark.

Photographic Society of France.

At the monthly meeting of this Society, held on the 2nd August last, under the presidency of M. Davanne, a communication was read from M. Fabre, secretary of the Photographic Society of Toulouse, on the emulsion process. In the preparation of emulsions by M. Chardon's method, the yellowish-red tint that the collodio-bromo assumes after being sensitised with silver nitrate is indicated, both by the inventor of the process and by several other authorities, as the sure sign of a successful result. Such a collodion emulsion gives a transparent film, which, by transmitted light, is of an orange red colour, and, after being washed with distilled water, furnishes dry plates of great brilliancy, that can be intensified without the least difficulty by the action of the alkaline developer alone. If the same emulsion be precipitated after neutralising the excess of silver by cobalt chloride, and the precipitate obtained be dried, washed, and redissolved, it will give slightly different results provided the bromised collodion be not too aged, but quite opposite results when it is from ten to twelve months old. In the first case the film obtained from the redissolved emulsion is less brilliant and transparent, is of a reddish yellow colour, and is not so easily intensified by the action of the alkaline developer. In the second case the emulsion powder gives a matt and chalky film, which is of a citron yellow colour by transmitted light; the image cannot be intensified either by the alkaline developer or by that of pyrogallic acid and silver. This change in the condition and quality of the emulsion can only be attributed to the precipitation. During the precipitation in hot water, the cells of pyroxyline which enclose the silver bromide seem to burst, owing to the tension of the vapour of the ether and the alcohol, and allow the silver bromide to escape, and this substance agglomerates into chalky grains. According to several authorities this chalky substance is nothing but the sub-bromide, Ag^2Br; their view is that the silver bromide, $AgBr$, when in a subdivided state, and in contact with hot water, splits up into Br and Ag^2Br, exactly as silver carbonate, when placed in a large quantity of boiling water, yields silver sub-oxide, Ag^2O. On this hypothesis it would be sufficient to precipitate the emulsion in bromized water, or in water containing cobalt chloride, to prevent the formation of the sub-bromide; but experience shows that the chalky bromide will still form under these conditions. M. Fabre believes that this chalky bromide is merely a molecular modification of silver bromide, $AgBr$, and gives the following experiments in support of this view. 1. If a recently prepared bromo-collodion be emulsified with silver nitrate, a large quantity of chalky bromide is obtained. 2. If resistant and powdered pyroxyline be added to an aged bromized collodion, and if, after some time, it be emulsified, a good powder of precipitated emulsion will be obtained. Note that in this case the resistance of the cells to the tension of ethereal or alcoholic vapours has simply been increased 3°. If we take a quantity of the same emulsion, as in the preceding case, suspend in a large quantity of ether, and then precipitate it with hot water, we obtain the chalky bromide, as our hypothesis would require. In fact, the resistance of the pyroxyline cells remains constant, while the tension of the ether vapour has increased; hence the cells burst, and the chalky bromide is formed. We see, then, that, having given an emulsion which yielded good results before precipitation, and wishing to obtain equally good results with the dried and redissolved powder, we must adopt one of the following plans. (1). Precipitate the emulsion after having concentrated it. In summer this can be effected by leaving the flask of emulsion open for forty-eight hours before precipitating it; or else by opening the flask, and stirring the emulsion inside it, which promotesevaporation. But preferably (2) neutralise by means of cobalt chloride, and let it rest for ten hours, then shake well, and pour the neutralized emulsion into a porcelain dish. When it has set on the surface, divide it with a spatula of glass or platinum, and pour on it a quantity of hot water, rather larger than the quantity of emulsion employed; by means of the spatula collect the flakes of emulsion into a precipitating jar, and wash several times by decantation; then pour on a cloth filter, and complete as usual. It is, perhaps, better to use alcohol of 40° for the last washing. The emulsion powder obtained by this method differs considerably in form and aspect from that of M. Chardon. It should be put to soak for an hour in the alcohol solution of quinine, which forms the final emulsion. This emulsion is of a ruby-red colour, and gives brilliant and transparent films that can be intensified by the alkaline developer alone. It should be added that if, before sensitizing the bromized collodion, uranium nitrate be added to the latter in the proportion of two grammes for every one hundred c.c. of collodion, the rapidity will be notably increased, and that the negatives are more brilliant by reflected light.

M. Davanne remarked that M. Andra had already observed the advantage of previously evaporating the alcohol and ether by pouring the emulsified collodion into a dish, and then treating it with hot water.

M. Franck de Villecholles warned his hearers against employing very hot water, as it precipitates a large quantity of chalky bromide; he obtains a better result by precipitating and washing the emulsion with water not exceeding 40° C. in temperature.

According to M. Balaguy this method, like all those which require the use of a concentrated emulsion, gives better results. He himself always makes his collodion with 3 per cent. of bromide and 3 per cent. of pyroxyline, and he used cadmium bromide alone. He sensitizes 150 c.c. of collodion at a time, and to that he adds 7·05 grammes of silver nitrate dissolved in 50 c.c. of alcohol; he uses no quinine in making the re-emulsion.

Talk in the Studio.

Dallastint.—A recent number of *Nature* contains an illustration of an article on the barometer produced by Dallastint, a method of producing printing blocks from nature invented by Mr. Duncan Dallas. Mr. Dallas' perseverance and ingenuity deserve success; but we regret to say that the example in question is not successful. Whether in the process of printing—apparently by ordinary machine—or in the preparation of the block, we think the process has not quite received justice. The block has apparently not been "cleaned," which involves a certain amount of finishing by the hand of an experienced workman, which all plates produced by the process, as a rule, require and receive.

Photographic Visiting Cards.—The Washington *Star* says that three Englishmen who called to pay their respects to President Hayes last week had their cards embellished with photographs of themselves. The photographs, which are of the head only, are placed in the upper right-hand corner, and are supposed to be the new British wrinkle in the way of visiting cards for gentlemen. The Editor of the *Philadelphia Photographer*, quoting the above paragraph, says, "Old here." We, Editor Photographic News, may add, "Very old indeed here."

The Medals at Paris.—No certain information is as yet attainable regarding the awards of medals at the Paris Exhibition. If recent rumours be correct, gold medals are less numerous in connection with photography than was at first reported. A recent issue of the *Standard*, quoting the *Continental Gazette*, which professed to give a correct record, gives the list of gold medallists, in which the only names for matters connected with photography which we find are, J. H. Dallmeyer and H. P. Robinson.

Photogrephs of Runic Remains.—Mr. Magnusson has returned from Sweden and Finland, says the *Athenaeum*, with a harvest of Runic Calendars. He has brought back photographs of 265 Runic staves, and books on wood and bone and horn, abounding in a variety of types as to the form of the runes and the mark-days' emblems, and no less various as to the terms by which the year commences.

Hardened Glass.—In the August number of the *Moniteur Scientifique*, M. J. Laurent, of Marseilles, cautions the scientific world generally, and chemists in particular, against the use of De la Bastie's toughened glass. He considers the objects and utensils made of this substance to be no better than so many Prince Rupert's drops or Bologna flasks, from which they differ only by their shape. M. Laurent adduces an instance where a dish made of toughened glass was used at a stearine factory at Marseilles; it suddenly broke into thousands of fragments upon being placed on the metal scale of a balance. It was then in a state of cooling down from 110 deg. C., at which temperature it had been maintained for some time; but it had previously been in use for about a month, and its sudden destruction was entirely inexplicable, save by the theory above mentioned.—*Nature*.

Obscure Enough.—First worthy Scot: "Well, Donald, was' you in the Aquarium to-day?" Second ditto: "Certainly.' First ditto: "It's a very fine place." Second ditto: "It's beautiful." First ditto: "Did you see the camera-obscura?" Second ditto (after a slight pause): "No. What tank was it in?' First worthy Scot "smiles all over."—*N. Y. Tribune*.

To Correspondents.

J. W. Bennett.—The simplest material you can use for making a mould from type is plaster of Paris. Or you may use sulphur, but it is more troublesome.

Ferrous.—There are various modifications of the gelatine emulsion process, each claiming to be the best, and we cannot undertake to decide *ex cathedra* upon their respective merits. You will find many articles on the subject in our recent volumes and Year-Books. The Year-Books for 1877 and 1878 each contain interesting and valuable articles giving details.

Thirty-Three.—The *Carver and Gilders Guide and Framemaker's Companion* is published by Kent and Co., of Paternoster Row; the price is two shillings and sixpence. This is the book you mean, we presume.

H. C. Bury.—No details are stated, but if we were trying the formula we should use about one grain each of the gold salt and the soda salt; but we do not like washing soda in the bath. 2. It is difficult to say which is the best means of reducing silver from a solution. Much depends upon the purpose, the experience, and the facilities. With experience enough to manage the operation with skill, there is nothing better than converting the bath into a chloride, and reducing, by the aid of a flux, in a crucible. Failing perfect facilities for this, a few strips of clean zinc will serve well.

Hugh Walker.—You must copy the engravings in the ordinary way, and obtain good negatives. We presume, as an amateur photographer, you will know how to do this. If not, write again, and we will help you. There are various modes of producing a transparency for the lantern from a negative. If you are familiar with a dry process, expose a dry plate for a few seconds under a negative, and develop. Or print on carbon tissue and transfer to glass; or print in collodio-chloride of silver on glass. Or if you are chiefly familiar with the wet process, you may produce your slides in the camera on wet collodion plates. If you have our Year-Book for 1868, you will find there fully detailed instructions—much fuller than we can possibly give in this column.

R. A.—Thanks. The hints are useful and interesting.

Reader.—The convergence of the perpendicular lines in the building is due not to any fault in the lens, but to the tilting of the camera. The camera has been tilted to take in the whole building, and this, unless a swing-back be used, inevitably causes this defect. It is a law of perspective, which cannot be evaded, that the object and the plane of delineation must be parallel. Failing this, the defect follows.

Aliquis.—The best kind of negative for producing transparencies is a thin, clean, delicate one, full of detail, not too dense, and not at all veiled or fogged. If chemicals, &c., are in good condition, the image, unintensified, will generally be vigorous enough. It is probable that the quarter-plate will answer for your lantern better than a half, as having a shorter focus.

S. Stains.—There are many varied formula for iodizing paper for enlargements by development. The following, we know, will yield good results. Take of iodide of potassium six drachms; bromide of potassium two drachms; chloride of ammonium one drachm; water one pint. Float the paper three or four minutes, or, if it be old, very dry drawing-paper, six minutes. A good sample of English paper is good; Whatman's drawing-paper probably is best. The silver bath should contain sixty grains to the ounce, and one drop of glacial acetic acid to each ounce, applied by means of a Blanchard's brush. Develop with a saturated solution of gallic acid. The addition of ammonia facilitates the mixture of albumen with water. For dry plates a substratum of gelatine or india-rubber is generally best. But edging with albumen or varnish generally answers.

Agricola.—The wider the aperture and shorter the focus, the greater the angle of light admitted. But in the change you propose there is very little advantage to be gained. Your own lens with an aperture of 1¾ inch and 4½ inches focus has a very small fraction less angular aperture than the proposed one with ¾ inch aperture and 1¾ inch focus; whilst the interior covering power of the latter will be a great drawback. The lens Mr. Skaife used was one made expressly for the purpose by Mr. Dallmeyer.

Nitrate.—We are not aware that M. Darlot has any especial agent in this country. We have no doubt that any stockdealer will accept orders on his account.

Several Correspondents in our next.

PHOTOGRAPHS REGISTERED.

Messrs. Tattersall & Co., Accrington,
Four Photographs of Rev. W. Brungate.
Mr. H. Robins, Landport,
Two Photographs of H.M.S. *Eurydice*.
Mr. H. W. Bevan, Lowestoft,
Photograph of Free Methodist Church, Lowestoft.
Mr. J. Patrick, Kirkcaldy,
Two Photographs of Wemyss Castle.

The Photographic News, October 25, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The London Press and the Photographic Exhibition—Two London Studios.

The London Press and the Photographic Exhibition.—Whatever may be said of the success of the Photographic Exhibition this year in Pall Mall, there cannot be a doubt as to the stir it has made in the London press. Within a week of the opening of the collection to the public, all the daily organs gave a notice of the pictures. The *Times*, the *Daily News*, the *Standard*, the *Morning Advertiser*, the *Globe*, and other influential papers called the attention of the public to the fact that the Photographic Society of Great Britain were holding their annual exhibition, and in most cases praised the fine collection of landscapes, which are certainly up to the level of other years. This recognition of the progress of photography in art and science by the London papers deserves notice, for it is due, in the main, to the Photographic Society itself. It is only by holding these exhibitions again and again, and pressing them upon the attention of the public, that one can secure proper recognition now-a-days in this giddy metropolis of bustle and excitement. Never has the press responded so spontaneously as on the present occasion, and we may now take it that the Photographic Exhibition is at last recognised as one of the autumnal attractions in town. It is only those who have tried, who are aware how difficult it is to attract the attention of the general public to a novelty. It is no possible use having a good thing to put before the public, if the public are not told where they can see it; and to get influential journals and journalists to make known the circumstance is not an easy matter. It is all very well to issue invitations to the *Thunderer* and *Jupiter Junior*, and to make little arrangements for the beings on earth who represent those powers to be well received. You may call spirits from the vasty deep, but there is as little response in that direction as in the organs of London opinion. The ear of the press has, however, now been undoubtedly secured after much pains year after year; and now the officers of the Society should see that they keep it. There will never be a lack of pictures and exhibitors so long as there is publicity given them. Notices in the press mean popularity and visitors, and, these secured, photographers will no longer hesitate about sending their best work. There is no reason why the Photographic Exhibition should not be the resort of thousands during its brief term of existence, and become a thoroughly paying institution to the Society. If it pays its way, this is a proof of many things. It is evidence that the Gallery is well attended by a high-class public, and that photographic work is being recognized. It is no good, at the winding up of an exhibition, to console oneself with the fact that if it has not paid, it has still been a success. The money is simply the test whether many or few visitors have attended, and we trust that the Society, while they consider the exhibitors in every way, will not spare a single effort whereby they can make the annual Photographic Exhibition a solid commercial success.

Two London Studios.—Experience lately of two studios in town has shown us that in some quarters, at any rate, there is no reason to complain of the dulness of trade. We accompanied a sitter as far as the reception room on two occasions recently: in the first instance, to a fashionable studio in Baker Street; and, in the second, to a busy, if, perhaps, not quite so high-class an establishment, rather more distant from Charing Cross. In the latter case, the charge for a dozen cartes-de-visite was ten shillings, so that a pretty good criterion may be formed of the customers; in the former not less than a guinea was the first charge made, for which, however, if we remember rightly, two dozen cartes were given. In the case of the former studio, where the model was a little boy of seven, the latter had to be smuggled in between two appointments. A sitter was induced to remain a little longer in the toilet room to make some alteration to her dress, and in the meantime the smaller model—for whom an appointment had not been considered necessary—was introduced into the glass room. This circumstance shows at a glance the state of business at the photographer's, where sitters arrived one after another as quickly as they could be taken. When it is, moreover, affirmed that the supply of the copies of the approved picture were not obtainable under a month's delay, there can be little doubt as to the prosperous character of the studio in question. The style of portrait here in vogue—it was not an unfashionable suburb to which we allude—was that brilliant glazed type, in which a superabundance of polished fixtures are seen, and in which the tone is rich and dark, while the features are bright and burnished. In a word, the portraits so much in favour were what Rejlander used to term the "French Plum Box" style, and however much these may be inveighed against, there cannot be a doubt as to their being liked by the general public. There is a highly-finished aspect about them, which the simple print, let it be ever so faithful, lacks, and there is, too, a suspicion about it of something foreign. These qualifications are quite enough recommendation in the eyes of very many, and hence it is that studios like the one in question prosper. Let it be understood that the photography itself is by no means despicable in these pictures, but, on the contrary, very well executed in most instances, and added to this, there is the glaze, the brilliancy, and a mass of elegant furniture thrown in, so that people get a lot for their money. In the Baker Street Studio to which we allude there was ample evidence of touching in the negatives, and one could not help thinking that a Viennese artist must have been busy on the film. In this case there were fewer "fixtures" to be seen, but the portrait had evidently been "beautified" to a considerable extent with lead pencil. In this case also sitters were coming and going pretty busily throughout the period of our visit, and in this case, too, a month elapsed before the full number of copies ordered were in the hands of the customer. In this studio it was the custom to destroy any proof that did not give satisfaction. A second sitting was not refused, but before the appointment for it was made, the rejected photograph was torn in halves in the presence of the customer. This latter custom, which is on the whole a very good one, and at once proves that the photographer takes the customer at his word, may nevertheless be open to misconstruction at times, for if performed with too much energy, it may be taken for loss of temper on the part of the portraitist, who, since he has made a bargain, is only acting up to it by taking his model a second time. In both instances we have mentioned, the money was required to be paid in advance, so that the customer actually parted with his coin a month before he received his goods, a matter of advantage on the part of the photographer which is not to be lightly estimated. With the reception and toilet rooms we were much pleased, for in both cases they were thoroughly and elegantly fitted with everything a lady or gentleman could desire. The furnishing of these rooms must have entailed considerable outlay, but we fully believe that it was money well spent.

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GERMAN CORRESPONDENCE.

BY DR. VOGEL.[*]

The Carbon Printing Process and Lichtdruck in Germany—Statue for Nicephore Niepce—Richard's Lightning Process—Art and Photography—Captain Waterhouse's Process of Photogravure.

I was called lately as judge to a provincial exhibition held in Flensburg, embracing the industry of Schleswig-Holstein. Exhibitions of this kind flourish in Germany, whilst I never have heard that any of the English possessions—Ireland or Scotland, for instance—had undertaken an equal enterprize. We suffer here now under the impression of three exhibitions: the Schleswig-Holstein exhibition of Flensburg, the Silesian exhibition of Breslau, and the Hanoverian exhibition of Hanover. I visited only the first one. Photography was amply represented, and offered, without bringing any striking novelty, many very interesting points. It was quite astonishing for me to see that most every one of the exhibitors had exhibited carbon prints alongside of silver prints, and that many practise this carbon printing process only. Berlin has about two hundred photographers; but I am convinced that not more than two of them practise this process on paper. The reason for it may be, that photographers in the provinces have more time to devote to their studies than those of the large cities; and those who would probably like to practise it, where would they find a printer? The most of the printers understand only the silver process. An equal surprise was given to me by the number of lichtdrucks exhibited. Most every one of the photographers has learned this process also. If they make business with it, it is another question; they certainly do not for common portrait work. Lichtdruck will only pay when repeatedly orders for several hundreds of duplicates come in; but to use it for one dozen of portraits is simply ridiculous. We have in Germany more lichtdruck printing houses than any other country in the world. All of them occupy themselves nearly exclusively with the reproduction of copper engravings, landscapes, illustrations for books, &c., and but little with portrait work. Ten years ago the inventor of the lichtdruck process expressed to me the hope that lichtdruck would, in the course of time, throw photography from the market. This hope is not yet realized, and I think it will not be realized very soon.

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[*] *Philadelphia Photographer.*

It may be known to you that a committee has been formed for the erection of the statue of Nicephore Niepce, in Chalons. The committee have sent an invitation in the French, English, and German languages, to all photographers of the world, animating them to contribute for the acccomplishment of this work. I recommend this enterprize highly, because Niepce's merits for photography are too great not to be publicly acknowledged. He was the inventor of heliography, has introduced the camera-obscura, and also was the first one who experimented with iodide of silver. He thus laid the foundation for Daguerreotypy, died before his invention became known, and Daguerre, inheritor of his secrets, in pursuing his ways, reached, soon after him, that perfection in which he offered to the public his new invention. However thankful I may be to the committee for the happy idea in which it tries to honour Niepce's merits, I cannot altogether approve that passage of the invitation which, in describing Daguerre's position to photography, gives to the latter only the credit of a mere plagiarist who, in adding some insignificant improvements to Niepce's invention, has published the whole of the new discovery as his monopoly. This is an error. Daguerre found a very important operation which had been quite overlooked by Niepce, "the development" with mercury vapours. Niepce required long exposures in order to obtain by means of the camera-obscura a visible impression on the iodide of silver plate; Daguerre shortened the exposure considerably, and brought out the picture by exposing the plate to mercury vapours. This discovery of the development gave to the invention a new necessary condition of vitality. This item alone should not be undervalued, notwithstanding all the merits of Niepce.

Whilst the "lightuing process" has found its introduction in America, and Klary, of Paris, demonstrates it before the public, another "lightning process" has been introduced by Dr. Richard, of Mannedorf, Switzerland. He has sent me some pictures, which were decidedly better than those which Klary has sent to me as samples of his work. Richard's exposure is a little longer (two and a-half seconds for a cabinet picture); but the shadings are far much finer, and the darks much richer than those obtained with Boissonas' process by M. Klary. Richard wrote me that he uses two baths; the plate is sensitized in the one, and after-sensitized in the other. A certain strength is required for these baths, and for this reason they cannot be used longer than eight days; after this they take a rest, and regain thus their usual strength. The real nature of this invention is kept a little obscure, certainly, because he intends to sell his process. That the use of two baths has its advantages is generally known, and has been first proven by Osborne, if I have a good memory.* It has also been introduced for portrait work; but if the advantages are great enough to justify the inconveniences to which it leads, is a question which practice only can determine.

However zealously art has been studied by photographers, there are still many who cannot understand why photography should not do the same that painting can do. Lately I was at a *soiree* of artists. Many tableaux were formed, Judith and Holofornes among the rest. A very nice-looking Jewess, with dark hair ornamented with gold, in oriental drapery, represented Judith. They could not find a better subject for this character. An Egyptian officer, who serves in our army, with his dark hair and beard, in a nice oriental drapery, had taken the rôle as Holofornes. A red cord around his neck made the effect as if his head had been cut off. The well-chosen background, the position of Judith, who held with her left hand the hair of Holofornes, &c., made altogether an admirable effect. The entertainment was general, and one photographer expressed the wish to take a picture of it. It was understood, and everything transported to his studio. The artist who had set them on that evening arranged also the position now, and the taking was carried out under the most favourable conditions. Everybody who had seen the tableaux liked the picture, to our photographer's greatest delight; but great was his disappointment when thousands of faults were found by those who had not seen the tableaux. Judith was nice, but nothing was to be seen of that terror which necessarily has to be found in her features after a crime. Gold in her hair and the red of the drapery formed one black mass. Holofornes, so Professor R—— told me, has the looks of a sleeping, and not of a dead person, &c. Certainly those who had seen the tableaux could add by their phantasy everything that photography could not show; thus the picture was for them a nice remembrance. Besides this, it is an example, among the rest, that many things may create a surprise for the time being, but that they are by no means masterpieces will be found out when photographed.

Captain Waterhouse, the excellent chief of the photographic department of the Surveyor's Office of Calcutta, India, has published, recently, an interesting work, "The Application of Photography for the Reproduction of Maps, &c.," in which he also describes a method for making zincogravures, which is much similar to Goupil's method. The latter, originally invented by Woodbury, improved by Rousselon, is still a secret. All that is known is that Goupil, in Paris, produces first a bold relief picture, which serves him as a pattern for the manufacture of a metallic printing-block; but it is not known yet how he produces the grain in the gelatine relief, which is necessary for the production of half-tones, and how he reproduces his grain on the metal. Goupil makes plates of twenty-five inches square, which cannot be obtained by hydraulic pressure, after Woodbury, but very probably by means of galvanism.

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* The use of two baths, the second being uniodized and somewhat weaker than the first, was first suggested by ourselves in an early volume of the NEWS, before Mr. Osborne left Australia.—ED. PHOTO. NEWS.

The grain in the gelatine, so they say, is produced by adding fine sand or glass powder to the gelatine; others reject this idea, and say that the grain is obtained by the use of chloride of lime. Alongside of all this supposition, it is interesting to see Waterhouse's results. He makes a carbon print, transfers it to a copper plate, and tones it with an alcoholic solution of tannin, 5:100; after this it is reproduced by galvanism. The toning with tannin gives the gelatine film the grain, and prevents it from swelling in the copper bath. I obtained with his method some copper plates, in copying a negative very long on carbon paper, transferring to glass which was coated with a gelatine solution, 5:100, and toned with chrome alum. After development on this plate the picture was toned with a tannin solution, dried, rubbed in with a solution of wax in turpentine, and finally rubbed in with graphite; it was then ready for the galvanic reproduction. This is the way in which Waterhouse produces plates for half-tones.

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JANSSEN'S NEW METHOD OF SOLAR PHOTOGRAPHY.

BY H. F. BLANFORD.[*]

In two papers published respectively in the *Comptes Rendus* for December, 1877, and in the *Annuaire* of the *Bureau des Longitudes* for the current year, M. Janssen has described a new method of photographing the solar disc, which he has successfully carried out at the Meudon Observatory, during the past twelve months; and he has also drawn attention to some striking features in the constitution of the photosphere, disclosed for the first time in the beautiful pictures which are among the first results of his process. These may be regarded as only the forerunners of further important discoveries. Through the courteous liberality of M. Janssen, I have lately had the advantage of studying the process in the Meudon Observatory, and a description of its distinctive features, and a brief notice of such of the results as M. Janssen has already published, will certainly be acceptable to many who are interested in the recent developments of solar physics, and have not ready access to the original papers.[*]

M. Janssen's pictures of the solar disc are distinguished from all those previously obtained with the photo-heliograph, not only by their great size (30·5 ctm. diameter), but more especially by the remarkable sharpness and definition with which they display the details of photospheric structure, which are such that, for the purpose of their more effective study, it is found advantageous to enlarge the original pictures to three and even nine times their original linear dimensions. The greatly extended means of research which M. Janssen's invention places in the hands of the solar physicist will be obvious, when we consider the difficulties which attend any prolonged ocular inspection of the solar disc, hitherto the only practicable method of examining its detailed structure. "In spite of the interposition of coloured glasses, helioscopes, &c., the eye must seize on the details in a dazzling field, and perform its functions under conditions which are quite unfamiliar. The true variations of luminous intensity in different parts of the image can no longer be appreciated, and the impressions produced do not correspond to reality. Thus may be explained the diversity of the opinions which have been put forward respecting the forms and dimensions of the granulations, and of the constituent parts of the solar surface"—diversities well illustrated by the old controversy of the "willow-leaf" and "rice-grain" bodies in the photosphere. In M. Janssen's pictures the forms, sizes, and arrangement of the bodies described under these appellations are exhibited in the most satisfactory manner, and as, in a favourable state of the atmosphere, the pictures may be repeated at as short intervals as the operator pleases, the movements and changes of form exhibited by these bodies may be studied with the utmost ease in a register which preserves the most fugitive phases of their appearance, and is available for leisurely re-examination at any future time.

Before noticing the novel facts which M. Janssen has thus brought to light, I will briefly describe the principles of the process itself. The main difficulty to be surmounted in order to obtain a sharply defined photographic picture of the details of the solar disc is presented by the phenomenon known as photographic irradiation, in virtue of which a brilliantly illuminated surface occupies on the negative picture a proportionally exaggerated space, its borders being extended over the darker objects around. This phenomenon, M. Janssen remarks, "is very striking in all the photographs of total eclipses which have been obtained since 1860, which exhibit the images of the protuberances encroaching on the lunar disc, to the extent in some cases of ten and twenty seconds of arc, and even more." The granulations (to employ M. Janssen's terminology) visible on the solar disc, have a mean diameter of not more than one second of arc, and in ordinary photoheliograms their very existence is therefore completely masked by irradiation.

The simple and beautiful contrivance by which M. Janssen has succeeded in getting rid of irradiation is to restrict the photographic action to one small sheaf of rays of the spectrum, viz., those which extend from the line G a short distance towards H. In a series of experimental photographs of the spectrum which M. Janssen took in my presence (with calc-spar prisms and a rock-crystal lens), and in which the time of exposure was varied successively from two-thirds of a second to three minutes, those obtained with the shortest exposure represented only that part of the spectrum immediately continguous to G, and extending a short distance towards H; and, in this, the spectral lines were exhibited with extreme sharpness. With a more prolonged exposure the range of the image was greatly extended in both directions, accompanied by intensified action in the G-H region, which impaired the local definition.[*] Taking advantage of this fact, in the new process, the collodionized plate is exposed to the sun's action only so long as to allow of the action of the most actively photographic rays, and this is the cardinal condition of success. In practice, the duration of the exposure is restricted to between $\frac{1}{2000}$ and $\frac{1}{3000}$ of a second, in summer, being varied according to the season and to the time of day. The means by which this delicate adjustment is effected and verified will be described presently.

A second condition is, so to adjust the distance of the sensitized surface from the lens of the instrument that it shall exactly coincide with the focus of the G rays. The necessity of this precaution will be readily understood, when it is borne in mind that no lens is perfectly achromatic, and that, in virtue of the first condition, the rays in the vicinity of G alone produce the image. The remaining conditions are, the adoption of as large a plate as can be readily manipulated, and some improvements in the process of preparing and developing the plates, whereby a very perfect surface is insured for the reception of the image, and a graduated development after exposure.[†]

(To be continued.)

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[*] *Nature.*

[*] The present notice contains a more detailed description of the process than M. Janssen's original papers, and is published with his full approval and authority. With characteristic liberality, M. Janssen writes:—"Quant au procédé lui-même, il est evident que toute personne un peu au courant de la photographie astronomique pourra l'appliquer et obtenir bientôt des photographies semblables à celles que nous obtenons. Je serai aussi très probablement devancé sur plusieurs points de la constitution du soleil que ces procédés peuvent révéler. L'inconvenient n'est que pour moi, et je crois qu'il vaut mieux dès aujourd'hui livrer la méthode au public scientifique. Les progrès de la science y gagneront certainement."

[*] Owing, probably, to spherical aberration.

[†] In this part of the process, M. Janssen acknowledges the assistance of M. Arents, to whom the writer is also indebted for much information.

AN APPARATUS FOR FILTERING THICK FLUIDS, ESPECIALLY GELATINE.

BY BARON SZRETTER.[*]

For the last eight years I have occupied myself exclusively with the carbon process in photography, and have had during that period to work continually with gelatine, but without finding a convenient filtering apparatus for that colloid. Under these circumstances, it is not surprising that I endeavoured to construct such an apparatus for myself, and at last I have succeeded to my entire satisfaction. I believe that I shall be rendering a service to photographers—especially those who work with gelatine—as well as to pharmaceutists, chemists, and manufacturers, who have to filter thick fluids, colloids, and fats—by making them acquainted with my invention.

The filtration of certain substances, such as gelatine, is attended by four great obstacles, which all the filters that have as yet been invented only partially overcome; my apparatus, however, completely gets over them. These obstacles are: 1. The filtering paper is very soon fouled, in consequence of the pores becoming choked by the sediment, which is heavier than the liquid to be filtered. I obviate this by making the liquid pressure to act upwards—that is, I filter from below to above. 2. The filtering paper tears under a strong pressure. This does not occur when it is supported by a flexible and permeable material. For this purpose I use felt, and that no hairs may come off I line it with flannel. 3. Dense liquids—like melted fat, castor oil, syrups, glycerine, solutions of gum, gelatine, and albumen—pass with some difficulty through filter paper; such substances as gelatine must, therefore, be diluted with water, and this produces considerable inconvenience, particularly to photographers engaged in phototyping. To remove this disadvantage the best way is to increase the pressure on the liquid over the filter paper. In my apparatus the pressure can be increased to 10, 20, 30, or even 40 times that in an ordinary filter, by lengthening at will the column of liquid. 4. Certain oils and fats, wax, bitumen, stearine, &c., as well as gelatine, can only be filtered at a certain temperature, sufficient to keep them in the fluid state. On this account my apparatus is provided with a hollow envelope, which can be filled with a hot liquid, and the required temperature maintained by means of a spirit lamp. For a temperature of 100° C.—as, for example, in filtering gelatine—the envelope can be filled with water; for a higher temperature, oil must be used.

My apparatus consists essentially of two vessels—one above, the other below—communicating by a tube which can be lengthened or shortened according as the liquid is to be filtered, and under a greater or less pressure. Around the edge of the lower vessel is a soldered ring of strong brass plate, from two to three c. met. broad. Over this ring comes the filter paper, surrounded with a circular covering of strong felt lined with flannel. In order that the liquid to be filtered may not be able to penetrate under the filter paper at the side of the brass ring, a second ring of strong iron is pressed on to the felt by means of a screw, so that there can be no free space between the ring and the filter paper. Further, to prevent the felt from being thrown out of shape by the pressure of the liquid, which would cause the filter paper to tear, it is covered with a wire net, which keeps it pressed down.

When the liquid does not require to be kept hot, this apparatus answers its purpose completely. The liquid to be filtered is poured into the upper vessel, from whence it passes through the tube into the lower vessel, and then successively through the layers of filter paper and felt. To collect the filtrate on top of the felt, a ledge is fastened over the brass ring, forming another vessel, which is furnished with a spout for the liquid to run off. When the substance to be filtered has to be kept hot, as in the case of gelatine, the whole apparatus is surrounded with another and outer vessel, and on the other side a tube is attached in order to induce a circulation of the hot liquid; it ascends in one tube, and descends through the other. A constant temperature is maintained throughout the operation by means of a small lamp.

The rapidity of the filtration depends not only on the pressure, but also on the density of the liquid and the kind of filtering paper. My own apparatus, which I have in constant use, is only 1·5 met. high; it filters ten litres of a solution containing fifteen per cent. of gelatine in the course of two and a-half hours. With filtering operations on a larger scale—as, for example, for manufacturing purposes—several tubes can be attached to the upper vessel, communicating each with a vessel below; these tubes are fitted with unions to screw on to nozzles in the vessels. For emptying, all the vessels are provided with tubulated outlets, furnished with taps.

TO DRAW A NEGATIVE OFF THE GLASS PLATE.[*]

First clean the plate very thoroughly by placing it in a hot solution of soda, afterwards letting it soak for half-an-hour in very weak nitric acid (one part strong acid diluted with ten parts of water); this should remove any signs of grease or dirt. Next rinse the plate well under the water-tap till the water runs off smoothly, and then rub it over, while still wet, with a cloth and some whitening, so that the water and whitening together form a stiff and nearly dry paste, showing strongly the marks of rubbing. When both sides of the plate have been treated in this way, the paste is allowed to dry completely: afterwards it is rubbed off with a clean linen cloth, and the plate polished until, when breathed on, the moisture lies evenly and shows no streaks or marks.

Meanwhile prepare the following solution:

Caoutchouc (in small pieces)	100 grammes
Chloroform	250 ,,

Let this stand for a couple of days, and shaking frequently, until solution is complete. Add 5 grammes of this solution to 250 grammes of the purest benzine, and filter through cotton-wool; the chloroform-benzine-caoutchouc solution is then ready for use. Now carefully dust the clean and polished plate, and pour on it the last-named solution in the same way as you would pour on collodion, and let the excess run off on a filter of cotton-wool; the film will dry in the course of half-an-hour. The older the film the better, provided it has not been allowed to dry in too warm a place.

On to this caoutchouc film is now poured the emulsion, or (in the wet process) the collodion, and the negative is prepared and finished in the usual way. When it is completed and has been properly rinsed, lay it for a few minutes in hot water to warm it, and then coat it with the following solution, previously filtered through muslin:—

Water	100 grammes
Gelatine	6 to 8 ,,

In summer, add one gramme pure glycerine for every ten grammes gelatine, and in hot climates a trifle more glycerine; too little of the latter substance makes the film of gelatine hard and tough, too much makes it sticky. Before pouring on the gelatine place the plate in a horizontal position on a tripod stand, and spread the fluid evenly over it with a glass rod. So soon as the gelatine is set, leave it to dry—still in a horizontal position; this is best effected in a drying box, which can be levelled by means of three screws, and contains a number of ledges on which the plates can rest. The drying-box may with advantage be slightly warmed during the first hour of drying by means of a spirit lamp. The first cost of such a drying box is not heavy, especially when it is considered that by means of it a number of negatives can be prepared simultaneously for drawing off.

When the gelatine film is perfectly dry, coat it with negative varnish, on which any necessary retouching may be effected; or if the latter be not required, instead of negative varnish use thin raw collodion. Finally, run a sharp knife round the edge of the plate, when the negative can easily be drawn off.

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[*] *Photographisches Correspondenz.*

[*] *Photographisches Wochenblatt.*

NEGATIVES FOR THE SOLAR CAMERA.

BY A. LIEBERT.*

The pictures are taken on a quarter-plate, or, with two exposures, on a half-plate, and, in order that all the details may come out sharp and well, a good three-inch objective, cabinet size, and of short focal length, must be used. The plates must be free from bubbles, streaks, or scratches, which are all reproduced in the enlargement. That it may give an even, thin, and transparent film without striæ or streaks, the collodion must be fluid and weakly iodized. As formulæ the following can be recommended:—

A.—	Ether (62°)	500 c.c.
	Alcohol (40°)	500 „
	Pyroxyline	8 grammes
	Ammonium iodide	2 „
	Cadmium iodide	4 „
	Cadmium bromide	2 „
	Tincture of iodine	40 drops
B.—	Ether	650 c.c.
	Alcohol	350 „
	Pyroxyline	9 grammes
	Cadmium iodide	7 „
	Cadmium bromide	2 „
	Pure iodine	0 5 „

These two collodions should be mixed before using, and if the film on the plate be not fine and even enough, a little ether and alcohol may be added.

As regards the silver bath, it must be weaker than for ordinary purposes, seven per cent. being strong enough. So soon as the iodide of silver film has lost its greasy appearance it must be taken out; it ought to be rather transparent.

The duration of the exposure is somewhat less than for a negative from which a print is taken in a frame. For developing, use iron-solution (made with glacial acetic acid and spirits of iron), but without intensifying, and let this developer act until all the details are completely brought out. From time to time fresh iron solution should be taken, in order to remove the free silver nitrate, which, if it remained on the plate, would augment the intensity of the negative; and this must not take place. Then wash the plate carefully, and fix with very weak solution of potassium cyanide, so that the negative may become quite transparent, without, however, losing any of its details. Finally, rinse the plate again thoroughly—at the last rinsing with distilled water—and leave it to dry slowly.

Solar negatives must not be varnished; for protection, they may be coated, after they have been rinsed, with a ten per cent. solution of gum-arabic, and, when thoroughly dried, with raw collodion. The film thus made strong and tough will not be in the slightest degree affected by the heat of the sun. Viewed by transmitted light, the film of the negative must be quite pure and free from defects, and the intensity must be less than in ordinary negatives; even the brightest lights must have some degree of transparency. More intense negatives take a longer time to print, which in other respects is not of much importance; but they also give coarse prints, wanting in modelling, and with hard abrupt tones. On the other hand, negatives that are too thin give grey prints without any detail, and with no contrast between light and shade.

SCIENTIFIC DEMONSTRATION OF A HORSE'S MOTION.

The *Scientific American* of October 19th gives a full-page illustration, engraved from instantaneous photographs, of the actions of a horse in motion. In the course of comment upon the series selected, our contemporary says:—

"We have selected two series, the first showing the movement of the horse 'Abe Edgington,' while walking at a 15-minute gait; the second showing the same horse while trotting at a 2:24 gait.

"In taking the negatives of these photographs, Mr. Muybridge employed a series of cameras, operated by electricity, and so placed as to fix with absolute accuracy the several phases in the continuous action of the horse while making one stride. The exposure for each negative was about the two-thousandth part of a second.

"The most careless observer of the figures will not fail to notice that the conventional figure of a trotting horse in motion does not appear in any of them, nor anything like it. Before these pictures were taken, no artist would have dared to draw a horse as a horse really is when in motion, even if it had been possible for the unaided eye to detect his real attitude. At first sight an artist will say of many of the positions that there is absolutely no 'motion' at all in them; yet after a little study the conventional idea gives way to truth, and every posture becomes instinct with a greater motive than the conventional figure of a trotting horse could possibly show. Mr. Muybridge's ingenious and successful efforts to catch and fix the fleeting attitudes of moving animals thus not only make a notable addition to our stock of positive knowledge, but must also effect a radical change in the art of depicting horses in motion. And every one interested in the physiology of animal action, not less than artists and horse-fanciers, will find the photographs of Mr. Muybridge indispensable.

"Our drawings, though admirable and instructive as such, are necessarily inferior to the photographs in scope and variety of detail; and they lack also that element of indisputable accuracy which belongs to the sun pictures. However truthful, an artist's work cannot have the convincing force of a photograph.

"We would suggest that for popular use the photographs should also be mounted on strips for use in the zoetrope."

PHOTOGRAPHY AND THE DETERMINATION OF IDENTITY.

Why the Right Man Possesses the Right Face.

"Thus, then, clearing the ground as we go, you will readily perceive how each feature of the face more or less differs in different persons. And these differences, you will recollect, being dependent upon the holding direct connection with the bony fabric of the face, will be *definitely stereotyped in all essential details, when each man stops growing.*

"And here I shall anticipate my argument a little by stating, in terms the most positive, that the method of *geometric admeasurement* shown in the Identiscope will, when carefully conducted, render plainly perceptible to the eye any discrepancy in the depth of either of the features—although it were even so minute as the sixteenth part of an inch.

"And here also I will deliberately assert, and boldly challenge contradiction, that not a bone of Roger Tichborne's face—(and, observe me, I do not here speak of him as the Claimant—I call him Roger Tichborne; *the* Roger Tichborne now in prison at Portsea)—I deliberately assert, and I challenge contradiction, that not a bone of Sir Roger Tichborne's face has increased in perpendicular extension by the tenth part—nay, not by the twentieth part of an inch perpendicular, from the day on which he sat for *that* Daguerreotype in Mr. Helsby's studio at Santiago, to the day on which, as the Tichborne Claimant, he sat for *that* photograph at Messrs Maull's studio at 187, Piccadilly, London. As for the *fatness* of the later face, that is simply in the nature of a straight-out projection, which adds nothing whatever to the relative *area* subsisting between each feature, nor makes the photograph any larger, excepting just around the lower portion of the face."—*Lecture on the Identiscope, by W. Mathews.*

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* *Photographisches Archiv.*

The Photographic News.

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THE PHOTOGRAPHIC EXHIBITION.

III.

WE return to the most interesting feature in the Exhibition—the examples of dry plate photography. The results of emulsion plates have been exhibited before, but it was not until the present Exhibition that they formed an especial feature. Gelatine emulsion work has, we think, been exhibited before, but at the present Exhibition the examples are numerous, not merely as interesting technical illustrations, but taking their place as competitors in the artistic race. Mr. Brownrigg, hitherto known as a successful wet plate worker, shows some excellent results by "Swan's process," by which we understand Mr. Swan's dry plates to be meant, and these are understood to be prepared with a gelatine emulsion. No. 83, *A Fir Grove at Farnham*, is a severe test for a dry plate, according to the old ideas of dry plate capacity. The dark masses of foliage reflect very little light, and a plate insensitive to weak radiations, as dry plates in the old time frequently were found to be, would not have been likely to present much detail in these dark masses. But Mr. Brownrigg's picture is excellent, and full of detail.

Mr. Edward Dunmore's frame (No. 94) is very interesting. In it we have examples of several dry processes, all, we presume, produced with equal skill and care, and all, we may add, showing these qualities in high degree, as well as much artistic taste. The best, in our estimation, is *Ffarm Road*, North Wales, produced on one of Col. Wortley's dry plates. This is exceedingly soft and delicate, and, with all, very brilliant and forcible. It is not an uncommon thing, in the resolve to avoid the old dry plate's fault of hardness, to secure softness, but with something of flatness and lack of force at the same time. Here both faults are perfectly avoided. *Llandudno Beach*, on an uranium dry plate, possesses similar qualities. The other prints from Liverpool dry plates, ordinary and extra-sensitive, are all very good.

Mr. Charles Bennett, a contributor to the Exhibition for the first time, we believe, takes a leading position amongst gelatine emulsion workers. His picture (No. 96) *Hampton*, by this process, is a charming landscape, admirably chosen and artistically treated, with the delicacy and atmosphere without any lack of brilliancy, which at one time was regarded as the especial quality of wet plate work. Mr. Bennett has also some good examples of collodio-bromide work, but gelatine is his speciality, and by his mode of working it (which will be found detailed on another page), it is startlingly rapid, and apparently quite manageable. No. 298, entitled *A Snap Shot with a Breechloader*, is a picture which carries its credentials of rapidity on its face. It is a series of river scenes. In one at this moment before us, is a boat with a couple of fishermen, stationed just below a weir, with the fast running water streaming by. An uplifted rod is rendered in the picture quite steadily, there is no sign of movement in the boat, which is quite well defined, and the hurrying wavelets are perfectly made out. It is taken with one of Dallmeyer's triplets, and a drop shutter was used. These facts sufficiently attest the rapidity of the plates; although perhaps in this instance, a second longer might have been better so far as exposure is concerned. No. 347 is probably a greater novelty. It is a view of a drawing-room interior, taken between nine and ten on a February evening illumined solely by the ordinary light of a sitting room with lamplight and candles. The exposure was one hour. We have seen something of the kind effected before on a wet collodion plate of very small size, sufficient only for a lantern slide; but this is on a ten by eight plate prepared with gelatine emulsion, and is unquestionably a marvellous *tour de force*.

Amongst the new dryplate workers, we find Messrs. A. and J. Bool, who always show some excellent landscapes of large size, and are not behind in this direction at the present Exhibition. But in No. 115, *Foliage and Foreground* for artists, we have some exceedingly fine examples of gelatine emulsion work. The studies are admirably chosen, and altogether artistic and charming.

Some good examples of the working of Liverpool emulsion are contributed by Herbert B. Berkeley. But the effect is marred to an extent which makes it difficult to judge of the quality of the pictures by two circumstances. The first is the square shape of the print, which is not simply unusual, but unpleasing. The oblong rectangle, made classic by ages of use by the greatest artists, is beyond a question a more effective shape; and where some speciality in the composition of the subject renders this undesirable, the circle is the best outline for a picture. This defect in shape is made more unpleasing by the unsuitable frames chosen. A plain oak flat with gilt head is for many pictures effective and chaste in its unpretentious simplicity; but for very small photographs it is unsuitable, and these are made to look heavy and uncomfortable by such an *entourage*. Nine times out of ten a simple gold frame is the safest finish for a photograph, and is never offensive. Captain Abney sends several unambitious but charming little pictures, some of them a little marred by a tendency to the defect in shape to which we have referred. His contributions have the added interest of illustrating several processes. No. 217, *The Eiger from the Wengerm Alps*, by the albumen and beer process, is one of the best. *A Lane near Dorking* (220), a beer preservative plate developed by the ferrous oxalate solution, is also very good, as are also the emulsion plates. Mr. H. G. Inskipp sends some views from the grounds of the Spa at Tunbridge Wells, produced on his new rapid dry plates. These are very good, but from some cause—chiefly over-printing, we think—they suggest heaviness from under-exposure. Mr. Payne Jennings, whose wet plate work in landscape has been so much admired, exhibits some subjects produced by Warnerke's washed emulsion. They are scenes on the Wharf (269 and 270), and are equal to the best work he has sent to Pall Mall.

A print, consisting chiefly of a scene foliage, is shown by Mr. Ritchie. The negative from which it is printed is also exhibited on the table, and has the distinction of being produced on a tannin plate thirteen years old at the time of exposure. It is stated that the time given, twelve minutes, was the same that such plates required when freshly prepared. This time seems somewhat startling, however, when compared with the minute and a-half which a gelatino-bromide plate, sent by the same exhibitor, received, which is exhibited by its side.

Of the older dry processes—such as the collodion-albumen, the Fothergill, &c.—we have no examples of at the present Exhibition. The emulsion processes are, indeed, the chief feature of interest, and the results are in all cases most excellent.

MEDALS AT PARIS.

The following official list of awards to British photographers, made at the International Exhibition in Paris, has reached us from the offices of the Royal Commission, and is to be regarded as correct, and superseding all vague rumours. The list includes "Photographic Proofs and Apparatus," and constitutes Class XII. The Juror for England was Mr. Wm. England.

Gold Medals.

J. H. Dallmeyer, Bloomsbury Street—For lenses.
Vernon Heath, Piccadilly—For studies of landscapes.
H. P. Robinson, Tunbridge Wells—For photographs, artistic combinations.
Ross and Co., New Bond Street—For lenses.

Silver Medals.

Autotype Company, 36, Rathbone Place—For photographic proofs by carbon printing and collotype process.
William Bedford, 326, Camden Road—For landscapes.
Elliot and Fry, 55, Baker Street, London—For portraits.
R. Faulkner and Co., 21, Baker Street—For portraits of children.
Mawson and Swan—For collodion and other photographic specialities.
Payne Jennings, Elm Grove, Rosendale Villas, West Dulwich—For landscapes.
Robert Slingsby, 168, High Street, Lincoln—For portraits and landscapes.
Leon Warnerke, 10, Linden Grove, Peckham Rye—For sensitive negative tissue and apparatus for its use.

Bronze Medals.

Charles E. Bandoux, 59, New Street, St. Heliers, Jersey—For photographic views and portraits.
Albert Boucher, 15, King's Road, Brighton—For portraits.
T. M. Brownrigg, Artington House, Guildford—For landscapes.
Alfred S. Fisk, St. John Street, Woodbridge—For photographs of animals.
Samuel Fry, 9, Surbiton Park Terrace, Kingston-on-Thames—For effects produced by a number of negatives.
George Hare, 26, Calthorpe Street—For photographic chambers and appliances.
David Hedges, 7, Queen Street, Lytham—For studies of animals.
A. Lamont Henderson, 49, King William Street—For photographs on vitrified enamel.
Liverpool Dry Plate and Photographic Printing Company, 1b, St. John's Hill, Clapham Junction—For photographs from negatives made on emulsion plates.
London Stereoscopic Company, 110, Regent Street—For portraits.
William Sherlock, Budleigh Salterton, Devon—For photographs of animals.
Henry Vander Weyde, 182, Regent Street, London—For portraits by the electric light.
William Henry Wheeler, 106, High Street, Oxford—For architectural subjects.
Frederick York, 87, Lancaster Road, Notting Hill—For animals on glass and paper.

Honourable Mention.

Adolphe Beau, 56, Welbeck Street—For reproduction of metallic objects.
Godbold and Basébè, South Kensington—For chromotype and carbon transparent photographs.
Lemere, Bedford, and Co., 147, Strand—For architectural subjects.
Lombardi and Co., Brighton—For photographs.
William Flower Maltby, 176, Upper Street, Islington—For photographs on paper and porcelain.
Norman, Carl, and Co, Graphic Villa, Tunbridge Wells—For photographic views.
Herbert Watkins, 1, Torriano Avenue, Camden Road—For photographs.
Matthew Whiting, Lavendar Hill, Wandsworth—For photographic views.

In the Dominion of Canada, Notman and Sandham, of Montreal, and an old esteemed correspondent, from whom we have not heard lately—Mr. A. Henderson, of Montreal—receive silver medals. Hunter and Co., Toronto, and S. McLaughlin, Ottawa, bronze medals. J. E. Livernois, Quebec; Notman and Frazer, Toronto; and E. Poole St. Catherine's, honourable mention.

At Trinidad, Mr. Felix Morne, honourable mention.

In New South Wales, B. O. Holterman, J. W. Lindt, and Turner and Henderson, receive silver medals; Mr. T. Richards, a bronze medal; and Messrs. B. C. Boake, Greenfeld, J. H. Newman, and D. Scott, honourable mention.

In Victoria, Mr. J. Mettleton and Mr. J. Noone, honourable mention.

In Queensland, Mr. R. Daintree, a bronze medal.

In South Australia, Mr. H. Davis and Mr. G. Freeman, each a bronze medal; and G. W. Sweet, honourable mention.

In Ceylon, Mr. J. Lawton, Kandy, receives a silver medal; and W. H. Skeen and Co. a bronze medal.

At the Cape of Good Hope, Mr. Aitchison, S. B. Barnard, J. E. Bruton, Froumann, W. Roe, and the Secretary for Native Affairs, all honourable mention.

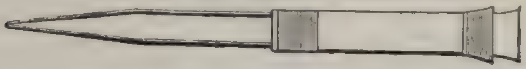
DROPPING BOTTLES BANISHED.

BY C. J. M.

Handy dropping tubes are made as follows:—

Take a piece of glass tubing of the required diameter, about 8 inches long, heat the centre over a gas flame, draw it into points, and break them apart to the large end of each dropper: now attach a piece of india-rubber tubing about four inches long, close the other end of the india-rubber tube, with a cork (the rubber may be tied to the cork, to insure its being air-tight). It is unnecessary to describe their use.

DROPPING TUBE.



NEGATIVES WITH GELATINE EMULSION.

BY CHARLES BENNETT.

To produce gelatine films, the appliances required are few in comparison to those necessary for collodic-emulsion plates, and fewer still than for the wet process. Gelatine, bromide of ammonium, nitrate of silver, distilled water, and alcohol are the only articles required from the chemist; a pneumatic plate-holder, an ebonite dish, spirit level, two or three square feet of plate glass, a gallon bottle, a thirty, ten, and a three ounce ditto, a glass funnel and rod, and some fine muslin can easily be pressed into the service. Those who practise the collodion processes will unfortunately have too many of, at all events, *some* of these articles lying about. I should even recommend a general clear up, and start *de novo*, as with the spare light to be used, silver baths and iron solution are not good company for gelatine emulsions. The following gives the most sensitive result:—

Ammonium bromide	... ...	7 grains
Silver nitrate	... ...	11 ,,
Gelatine	... ...	20 ,,

for every finished ounce of emulsion (the solvent being water); but as the emulsion will absorb water in the process of washing, only four drams instead of one ounce must be used in the first instance. The salts should be weighed as accurately as possible, and as the solvent is inexpensive it may be better to deal with ten ounces at a time; an error of half a grain in either salt is then spread over a greater bulk, and would not so much influence the result. Place therefore seventy grains of the ammonium in a thirty-ounce bottle, add thirty drams of distilled water, and, when dissolved, add the two hundred grains of gelatine (Nelson's No. 1 photographic). Stand the bottle in a vessel containing two gallons of water at 90° Fahrenheit till perfectly melted. Perhaps in an hour the bottles and contents will be also at nearly 90°. Dissolve the one hundred and ten grains of silver in ten drams of distilled water, also at the same temperature; darken the room as much as convenient, and add the silver solution to the bromized gelatine. I should say "a little at a time and agitate between each addition," but as it is difficult to prevent loss of silver solution where it is added in several portions, perhaps it is best to pour it in one thin stream *slowly*, and keep the bromized gelatine slightly rocking during the operation. Care is necessary to get all the silver into the bottle, therefore put four drams more water into the flask it was dissolved in to rinse it out thoroughly, and add that to the emulsion, then shake thoroughly. It must now be kept at between 85 and 90° temperature by placing it in two gallons of water, which will not lower more than 5° in twelve hours if covered over with woollen cloth; emulsify at discretion from twelve hours to seven days; rapidity increases in proportion to duration of emulsifying; twenty-four hours will produce drop shutter negatives, and extraordinary results can be obtained with a six or even three days' emulsion, provided the light in the operating room has been subdued in proportion to the sensitiveness of the plate. Agitate the emulsion every twelve hours.

To Wash.—Pour the emulsion into a gallon bottle, and roll under a tap till the inside of the bottle is evenly coated; let stand an hour to chill thoroughly, then pass a tube from the tap to the bottom of the bottle, let the water trickle through the tube gently for twelve hours, drain the bottle well, then warm it in water at 90° until the contents are melted; decant into a ten-ounce bottle, add five drams of alcohol, and fill up with distilled water at 90°; filter, whilst warm, through muslin. It will have been observed that whereas only forty-four drams of water were used in mixing the emulsion, it will measure, after washing, sixty or seventy drams, according to the quality of gelatine, the extra having been absorbed from the washing water.

To Coat.—Level a sheet of plate-glass about two feet square, and warm the plates to be coated to about the same temperature as the emulsion; coat the same as with collodion, except that a little must be drained off each of the four corners successively, which will keep the film even (do not drain nearly as closely as with collodion). A plate six and a half by four and three quarters will take one-sixth ounce of emulsion. A three-ounce bottle is a convenient size to coat from. By the time sufficient are coated to cover plate-glass, the first one will be chilled enough to lie on another part of the table and make room for another, and so *ad infinitum*.

Expose in the camera a trial plate, with the smallest stop of a landscape lens, one, two, three, four, and five seconds, by pulling out the shutter an inch at a time, of course capping the lens at each draw of the shutter; one of these exposures will be a guide for the next plate. Develop in an ebonite dish, soak the film in common water, drain, flush with

Pyrogallic acid	1 grain
Liquid ammonia, fort.	2 to 10 drops
Water	1 ounce

Use only two or three drops of the ammonia till well practised in the art of developing these plates; the larger quantities can be used when the exposure is cut down for instantaneous work. The development will be complete in a few seconds, and when the film begins to lose its opalescence in the shadows, the development will be finished. Wash and fix as for the wet process with hypo.

The light in the operating room from the time the silver is added should throughout be of the deepest ruby-colour, and the plates must be dried in total darkness. Failures and their remedies will be alluded to in a shorter paper next week.

To exemplify this process, a print is enclosed from a seven days' emulsion negative.

[The example referred to is in every way excellent. See also our remarks in our notice of the Exhibition, on another page of this issue.—Ed.]

PHOTO-COLLOTYPE.

BY CAPTAIN WATERHOUSE, B.SC.*

As the process previously described in the proceedings has since then been modified, and is, I know, exceedingly good for line work, the following description of the manipulations, extracted from the Annual Reports of the Surveyor-General's Office for 1871-72 and 1872-3, may prove of interest, especially as the working details of few of the other processes have been published.

The printing plates are of plate glass, about three-eighths or half an inch in thickness, evenly ground on one side with fine sand. When required for use, they are thoroughly cleaned to remove all grease, and then carefully levelled.

The composition of the gelatine coating is as follows:—

A.—Gelatine	1 ounce
Glycerine	1 dram
Distilled water	6 ounces
B.—Albumen†	1 ounce
Distilled water	1 ,,
C.—Tannin	10 grains
Water (in hot weather, spirits of wine)	1 ounce

The above quantity will be sufficient for two square feet of plate.

As soon as the gelatine in solution A is quite dissolved, B is added, and then C is poured in gradually with constant stirring. The whole is strained through two thicknesses of cotton cloth, and poured evenly over the plates on the ground side, any air-bubbles being carefully removed. The plates are then covered over with a light paper cover, to prevent dust falling on them, until they are set, when they may be removed into the open air, and turned, face downwards, to dry. Or they may be dried with gentle heat in a drying-box; but too quick drying is to be avoided, because the gelatine films will dry unevenly.

When the plates are dry, they may be put away till required or sensitized in a bath of—

Bichromate of potash	1 part
Water	20 parts

They are allowed to remain in this for five minutes, then removed to a drying-box, and dried with a gentle heat. When dry, the deposit at the back of the plate, and any inequalities at the corners of the gelatine film, are removed, and the plates are ready for exposure under the negative, which must be a reversed one obtained as described in section 3.

If the reversed negative has been taken direct on glass, the exposure to light is performed in a pressure-frame, in the same way as for ordinary photographs. It is advisable, however, to secure clean margins by shielding the borders of the negative by means of a mask, cut out in yellow or brown paper, which should well overlap the edges of the printing plates. The sensitive plate may be rubbed over with a little powdered soapstone to prevent any adherence to the negative. Some sheets of dark-coloured paper or cloth should be placed behind the sensitive plate, and then a thick sheet of glass to give a good even pressure.

If, however, the negative has been stripped from the glass, and is in the form of a thin skin, the most perfect contact will be produced by transferring the negative on to the surface of the printing film in such a manner that it may be removed again after the exposure.

This operation presents some difficulties, but I have found the following method answer well. The sensitized and dried gelatine surface of the printing plate is covered with a very thin even coating of wax dissolved in turpentine or benzole. The plate is then placed in a dish containing sufficient spirits of wine to cover it. The thin negative film is laid down upon the gelatine in its proper position; the plate and film are then removed from the spirit, and the negative film carefully squeegeed into close contact with the gelatine surface. The plate is then covered with a few thicknesses of blotting-paper, under a thick glass plate, and allowed to dry. When dry, the plate is ready for exposure. After exposure, the negative film is removed from the gelatine surface; and, if sufficient wax was used, and the film is fairly tough, it comes away without tearing. Should it tear, it should at once be dissolved off with ether, or there will be a continuating action of light on the parts of the gelatine surface protected by the negative film, so that they will print darker than the rest of the plate. Before printing, the wax should be removed from the gelatine with turpentine. The object of effecting the transfer in a bath of spirits of wine is, that neither the gelatine, wax, bichromate of potash, or negative film are in any way affected by it.

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* Continued from page 500.

† Thirty grains of carbolic soap may be used instead of the albumen.

The duration of the exposure to light varies from ten minutes in the sun for a clear line subject, to from twenty-five to fifty minutes for a subject in half-tones, according to the density of the negative and the intensity of the light. It is almost impossible to judge of the progress of the printing by inspection, and it is necessary to use an *actinometer* as a guide to the exposure. The following form of actinometer has been found to answer well for the purpose. It consists principally of a box, in the lid of which is fixed a translucent scale divided in fourteen squares of different densities, No. 1 being almost transparent, while No. 14 is almost quite opaque; and numbers corresponding to the densities are painted in opaque colour on the scale. The scale is made by taking a collodion negative of a drawing shaded in tints of different strengths, and should be intensified so as to correspond in density with the kind of negatives it is intended to be used with.

The body of the box contains a block for carrying the sensitive surface, which may be spread on paper or on a glass plate, and a strip of vulcanised rubber below it presses the block into close contact with the scale.

I prefer to use in the actinometer a sensitive film of the same composition as the printing plate; small slips of glass are therefore coated with the gelatine mixture, sensitized, dried, and exposed to light at the same time and in the same manner as the printing plates, and thus the progress of the action of light can be watched and timed very closely.

When the exposure to light is considered sufficient, the printing plate is removed from the pressure-frame and laid, gelatine side downwards, on a board covered with black cloth. The back, or under surface, of the gelatine is then exposed to light for about ten minutes, to thoroughly harden the gelatine, and prevent it from swelling too much in the after processes. It is well to conduct this second exposure under a piece of ground glass, in order to prevent any scratches, that may be on the back of the glass, from showing as white lines in the print. The edges of the plate are then protected by strips of paper coated with solution of india-rubber, and when the india-rubber is dry, the plate is soaked in water until all the soluble bichromate has been removed, and it is then ready for printing.

The plates can be printed in a lithographic press, but then they require to be fixed on a level stone with plaster of Paris. It has been found, however, more convenient, and in some respects better, to print them with vertical pressure in an ordinary Albion platen press; and, in order to prevent the glass being broken, the bed of the press is fitted with two or three thicknesses of kamptulicon, besides a sheet of vulcanized india-rubber, on which the plate rests. It is also desirable to place a piece of white paper over the bedding, in order to enable the state of the paper when it is being inked up to be better seen.

The inking-in requires great skill and care on the part of the printer, and is the most difficult part of the operation. The plate, having been well soaked in water, is laid on the press, and, after being wiped to remove the excess of moisture, is inked-in, if a line subject, with an ordinary lithographic roller charged with an ink composed of lithographic chalk ink thinned with a little olive oil, followed by rolling with a smooth roller to clear away the superfluous ink; a mask of the required size is laid on the plate to preserve the margins clean; over this comes the printing paper covered with a piece of soft felt, to drive the paper well into the hollows of the plate; the tympan is lowered, and the impression pulled in the ordinary way. The plate is then damped, and inked-in again, and so on.

Half-tone subjects are treated in the same manner, but it is sometimes advisable to use two kinds of ink of different consistence or depth of colour; a stiff or dark ink gives force to the shadows, while a thin or lighter coloured one will bring out the delicate half-tones. Rollers made of gelatine, glycerine, and castor oil may be used with advantage, as they drive the ink better into the hollows of the lines than the leather rollers. Capt. Abney, who has given great attention to these processes, says that the great secret of producing good results is to have the command of first-rate rollers. Glazed enamelled paper is generally used for printing half-tone subjects, but in some cases unenamelled paper answers well. The most suitable paper for printing seems to depend partly on the composition of the sensitive surface, and partly on the ink.

One of the great drawbacks to the extended use of the photo-collotype process for the reproduction of maps is the difficulty of making corrections on the plates. When the printing surface is a metal plate or lithographic stone, upon which a map has been either engraved, zincographed, or lithographed, additions and erasures may easily be made without any risk of the loss of the printing surface, or even of much damage to it. With the tender gelatine films the case is different, and, although writing or simple lines may be inserted without much difficulty, it would be almost impossible to successfully alter gradation of shade or to insert shaded details. On the other hand, the taking out of details must be done by some chemical means, which must always be attended by with the imminent risk of raising the gelatine film from its support, and the consequent utter destruction of the printing plate.

As maps, almost more than any other printed subject, require that it shall always be possible to make corrections on the printing plates, it is obvious that the use of any process which will not permit of this being done must be confined more to the reproduction of maps already printed or of an ephemeral character than to the preparation of new or standard ones. And thus, though photo-collotype is admirably adapted for reproducing copies of old or other special maps, which are, or can be, finished once and for all, it is not suited for maps on which corrections are likely to be required.

(*To be continued*).

PRESS NOTICES OF THE PHOTOGRAPHIC EXHIBITION.

(*From the* Globe).

The exhibition of the Photographic Society of Great Britain, now on view at the Gallery of the Society of Painters in Water-colours, fairly maintains the character established by various displays. Some disappointment will doubtless be felt that the names of Dr. Diamond, Mr. G. Wharton Simpson, Mr. Valentine Blanchard, and some other members of the Society, who, by their scientific knowledge, have contributed so largely to the progress of the art, are not to be found in the list of exhibitors; but, despite their absence, the collection is full of interest, displaying as it does infinite variety of subject and great diversity of technical method. Landscapes, as usual, form the largest, and, on the whole, the most satisfactory portion of the display. There are, it is true, some few instances in which the artist, unmindful of the very restricted range of light at his command, has attempted to realise effects of nature which painting can only suggest, and which lie entirely out of the reach of photography; but a large majority of the examples show not only taste and judgment in the choice of subject, but a right understanding of the limits of the process as well as of its capabilities. None among them are more complete and satisfactory than the series of views in Warwickshire and Wales by Mr. W. Bedford. Not only are they admirably manipulated and pure in tone, but in all the point of view is well chosen with regard both to composition and balance of light and shade. We remember to have seen no better example of landscape photography than his view "On the Llugwy, N.W." The scene is one of great natural beauty, and no discordant element disturbs its general harmony; there is nothing in it which a painter would wish to eliminate or to modify. Mr. Vernon Heath's numerous landscapes also display accomplished skill in the treatment, together with a fine sense of pictorial beauty in the choice of subject. His views in the Isle of Skye are especially noteworthy for their luminous quality and their delicate and truthful gradations of tone. In his autotype enlargements from small negatives Mr. Heath has been less uniformly successful, but some of them, and especially the two views of "Blaven, from Loch Hart, or Currie," are productions of rare beauty. There are many landscapes on a very large scale in the collection, but they are generally less agreeable in effect and less true than those of moderate dimensions. Among the latter, Mr. H. A. H. Daniel's "On the Froom, Bristol," and his "Old Cottages, Lynmouth," are worthy of especial commendation. Mr. Seymour Conway exhibits a frame containing several beautiful transcripts of Kentish scenery, and Mr. Payne Jennings a large number of picturesque and well-selected view in Ireland and Yorkshire. Amongst the best of the remaining landscapes are those by Mr. E. Brightman, Mr. H. Cooper, Mr. C. Bennett, and Mr. E. Dunmore. The difficulty of arranging a group of figures within the focus of the camera in such a way as to tell a story or realise an incident, and at the same so as to produce an agreeable pictorial effect, seems well nigh insuperable. The attempt has often been made, but never very successfully. Not much can fairly be said in favour of the few efforts of the kind in the present collection. In the two pictures by J. Chaffin and Sons—"Criticism" and "Visiting the Studio"—the figures are constrained in attitude and ill-arranged as regards composition. Mr. H Garrett Cocking, in his "Scene from Husband in Clover," has been somewhat more successful, the figures being well grouped and expressive in gesture; but here the materials of the scene are not disposed so as to produce a broad and simple effect of light and shade. Of Mr. Cocking's three single figures—"Miss Amy Roselle," "La Gitana," and "Madame Rose Hersee as Elvira in the 'Rose of Castille,'" we can, however, speak with almost unqualified praise. The figure in each is gracefully and naturally posed, and the draperies are arranged with artistic taste and skill. These works are also noticeable as specimens of pure untouched photography, comparing favourably in this respect with many sophisticated productions to be found on the walls. The numerous portraits by Lombardi and Co., for instance, are so completely stippled over that scarcely any of the original photograph is to be seen. Not only are all asperities in the faces of the sitters removed, but scarcely any character or individuality remains. In a somewhat modified degree, the same remark applies to the portraits by Messrs. Lock and Whitfield. The Autotype Company and the Woodbury Company exhibit portraits of colossal dimensions enlarged from small negatives. These may be interesting as curiosities, but they are weak and ineffective as pictures. They both, however, send some very admirable reproductions of pictures. By the Autotype Company there are transcripts, faithful in every detail, of Mr. Poynter's "Israel in Egypt," and of Mr. F. Madox Brown's "Cordelia's Portion"; and the Woodbury Company send admirable copies of the two pictures exhibited by Mr. Sant at the Academy last year. It is to be regretted that there are no copies of original drawings in black-and-white in the collection. Photography could not be more worthily employed than in producing facsimiles of the drawings by the great masters of art, which abound in this country, but which are accessible only to a few. The only specimen of micro-photography in the Gallery, by George Berwick, M.D., shows various sections of the human skin enormously magnified. If not attractive to the ordinary visitor, it will interest the physiologist, and it serves to show what valuable aid to science photography is capable of rendering.

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Correspondence.

EMULSION FOR PORTRAITS.

Dear Sir,—Referring to your notice, in last issue, of my exhibit, I think I ought in justice to say that all the credit of the portrait "Age of Innocence" belongs to Mr. Warnerke and Mr. Payne Jennings (who kindly lent a hand), my part having consisted only in posing and securing the attention of the subject.

My object in addressing you is that I think the time is coming when the days of the nitrate bath are numbered, and that emulsion or prepared plates will make *the dipping* a thing of the past, providing that the conditions of rapidity and quality are fulfilled. This I have often spoken of to Mr. Warnerke, and have occasionally been favoured with an experiment for rapidity with that gentleman. I think he has only been deterred from making his emulsion a commercial matter from his diffidence to claim success before he was absolutely sure that he could *invariably secure perfection.*

However that may be, I can safely say that the exposure of the negative referred to was not probably more than a single second, and further, it was a cabinet size (copy enclosed), and not taken, consequently, with a 2c, which lens we are compelled to use if we wish to get what is called an *instantaneous picture*, and which then is only a small carte, the *centre* alone being of any use.

Of course I and my associates are responsible for the enlargement. I trust that on comparison it will be found that we have not failed, either in the artistic treatment or faithful rendering of the portrait.—I am, dear sir, yours very truly, T. G. Hemery.

25, *Hanover Street, Peckham, October*, 23*rd.*

[The enclosure is a charming picture in every way, and for delicacy and soft gradation it could not be surpassed.—Ed.]

ACETIC ACID.

Sir,—Some four or five years since, I purchased a Winchester each of two preparations of acetic acid—"Carl Dorn's," and "Tulley's." Having used all, and desirous to obtain a further supply, I applied at Solomon's (from whence I obtained them originally), but am met with the reply, "We do not supply the articles, nor can we tell where they can be obtained." I write this, therefore, in the hopes that by its publication in your journal some of your readers may be able to inform me where I can obtain what I require, or give some information as to their composition, for I have found in my practice that they work remarkably cleaner and quicker than the ordinary glacial, and are, therefore, invaluable for use in the dark-room.—Yours, &c., P.

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Proceedings of Societies.

Manchester Photographic Society.

The Annual Meeting was held at the Memorial Hall, on Thursday evening, the 10th inst., Mr. Alfred Brothers, F.R.S., President, in the chair.

After the minutes had been read and passed, the President read the

Annual Report.

"In the Annual Report of the past session your Council have the pleasure of stating that the Society is in a condition of full average prosperity. Members retire, but others enter, and the members at the annual meeting are tolerably even.

"The attendance at the monthly meetings has been good, and the members have been liberal in supply of interesting matter and objects for investigation and examination. Papers on set subjects, for some reason, appear to be going out of fashion; but as long as the interest of the meetings is sustained in other ways, this need not be the subject of serious regret.

"The Treasurer will inform you of the financial position of the Society. There are at present seventy-two members on the roll, against seventy at the last annual meeting.

"The average monthly attendance has been thirty-three, against twenty-nine and a-half. The least number at any meeting was twenty-nine.

"Four papers have been read before you as follows:—

"'On a Process of Reducing Silver Chloride to the Metallic

State,' by Mr. J. W. Leigh; 'On Double Printing of Transparencies for the Stereoscope,' by Mr. S. H. Ashley Oakes; 'On the Gelatine Process, and the Preparation of Dried Pellicle,' by Mr. T. Chilton.

"Mr. W. J. Chadwick, in addition to many other interesting contributions, read a paper, by Mr. Woodbury, 'On the Modern Magic Lantern.'

"Mr. McCall, on behalf of Mr. F. York, exhibited a Keevil lantern, and demonstrated the capabilities of the instrument.

"Mr. D. Young also exhibited one of Keevil's lanterns, perfected.

"Many other interesting things, which it is not necessary to dwell upon in this report, have been brought under your notice, for which your Council beg to thank the several contributors.

"The February meeting was a great success; an excellent supply of comfortable things enabled the unusually large company to practise the wet and dry processes to their entire satisfaction. You had on that occasion the pleasure of entertaining some of the leading members of the Liverpool Amateur Photographic Association.

"As regards the proposed *soiree*: your Council were invited by the Peel Park Museum Committee, under exceptionally favourable and liberal conditions, to hold an exhibition of photographs in their building, in connection with the opening of the new wing for art purposes. The Secretary of your Society, however, received so little response to his applications for exhibits that the invitation had to be declined.

"The only out-door meeting of the season, to Hawarden, though late, was a real success as regards enjoyment, and probably so photographically. This meeting, as you are aware, was held jointly with the Liverpool Amateur Photographic Association.

"Your Council, in conclusion, have to thank all the members who have contributed in the least degree to the success of the session; and they take this opportunity of tendering their acknowledgments to the Belgian Photographic Society for the periodical transmision of that Society's *Bulletin*."

The annual report received the confirmation of the meeting, and the election of officers and Council for the ensuing year was proceeded with, and resulted in the election of the following gentlemen:—

President—Thomas Haywood, Esq.

Vice-Presidents—Mr. A. Brothers, F.R.A.S., Rev. Canon Beechey, M.A., G. T. Lund, M. Noton, and I. Wade.

Council—Messrs. Charles Adin, R. Atherton, J. J. Kershaw, J. W. Leigh, S. H. Ashley Oakes, J. C. Sewell, E. Woodward, J. Warburton, N. Wright, and James Young.

Treasurer—Mr. W. G. Coote.

Honorary Secretary—W. J. Chadwick, Prince's Bridge Iron Works, Salford.

A vote of thanks was passed to the ex-President, the ex-Secretary, and the Treasurer.

Some of the members who were present at the recent outdoor meeting exhibited the results of their day's work.

The meeting, which was thinly attended, was then adjourned.

Bristol and West of England Amateur Photographic Association.

The Annual Meeting was held at the residence of the Honorary Secretary, Mr. H. A. H. Daniel, on Friday, 18th inst., Mr. T. Davey in the chair.

The minutes having been read and passed, Mr. Stevens was unanimously elected an ordinary member of the Association.

The Hon. Secretary then presented the Report, which is as follows:—

"*Report for Session ending October*, 1878.

"In presenting the Report for the past session, your Council desires to state generally that the Association is steadily advancing, and making itself more widely known; nevertheless, there is considerable room for a great amount of interest to be taken in the Association's proceedings, and more constant zeal in endeavouring to add members to it.

"The following communications and papers have been read before, and contributed at the meetings:—'The Splitting of Negative Films,' by Dr. Mantell; 'Exhibition of Pyro Hydrogen Light; Trial of Lanterns; 'Whims of a Landscape Photographer,' by Mr. E. Brightman.

"Your Council has pleasure in stating that the financial position is satisfactory, there being a balance in favour of the Society.

"There have been seven indoor meetings and one excursion during the session, and your Council is glad to find the attendances have shown an improvement on the preceding session, with the exception of the excursion meeting, which, contrary to the general rule, was not so well attended; at the same time, every person present at the latter operated, which has not been the case before.

"Your Council, in concluding the Report, desires, with still greater emphasis, to impress on the members generally the fact that *each one individually* is, to a *large* extent, responsible for the success and usefulness of the Association, as by allowing one's interest in the meetings to vary, and one's attendance to be interfered with, poor meetings result, thereby lessening the attractiveness of the Society to the remaining and attending members.

"Your Council is most desirous that the prosperity of the Association should increase rapidly, and its usefulness be widely spread, and, therefore, would urge on every member the great desirability of speaking of it, and making it known as much as possible, and of recruiting for its ranks as many new members as in any way possible."

Lieutenant Lysaght proposed the adoption of the Report, and remarked upon its generally satisfactory character.

This was seconded by Mr. Brightman, and on being put to the meeting by the Chairman, was carried.

The accounts of the Association having been audited and found correct,

The Hon. Secretary said, there were one or two things he desired to bring before the meeting. The first thing was to read a letter from the President, Mr. W. W. Stoddart, desiring that a fresh President should be elected, as he found that the number of things he now had in hand were too many, and his health, he feared, would not be able to stand the strain if continued. This communication he (the Secretary) knew would be heard with great regret by every member of the Association, as Mr. Stoddart's great scientific knowledge, most genial bearing, and valuable contributions to the Association when circumstances permitted him to be present, could not be overrated.

After some conversation on the subject, it was decided to ask Mr. Stoddart to reconsider his determination, and to assist the Council in selecting a third Vice-President for election by the Association.

The Chairman considered this the best course to pursue, as the present President was a gentleman whom the Association could ill-afford to lose.

The Secretary then introduced a subject which claims a certain amount of careful consideration, viz., the question of having a monthly journal, with full accounts of meetings, &c., circulated amongst the members, as proposed some little time since by Mr. Brightman in conversation. This speaker pointed out that it had been thought that it would be a very acceptable arrangement to the corresponding members, as at present those who are almost always debarred from attending the meetings at all during the year seemed very isolated, and, if instituted, it was felt that this state of things would be very much improved.

After being discussed, it was decided, on the motion of Mr. Brightman, seconded by Lieut. Lysaght, that a journal of the kind described be circulated each month, and every member supplied with an almanac at the end of the year.

Lieutenant Lysaght detailed some experiences with Swan's dry plates, having been much pestered with blistering of the film, and could not thoroughly account for it, the plates of his own make (also gelatine), when subjected to identically the same treatment, showing no signs of behaving similarly. No one else present had experienced this, and

The Chairman handed round the first two of Swan's he had tried, which were held to be quite a success, and, when compared with some collodion emulsion plates, even allowing for defects, seemed to be of a more delicate quality.

Mr. Brightman remarked upon the great sensitiveness of, and certainty in using, the plates in question.

Lieut. Lysaght stated that he was making some rather important experiments in connection with the making of gelatine emulsion, and which, if they resulted as he expected, he would communicate to the Association.

Mr. H. A. H. Daniel, having made a few hopeful remarks as to the opening session, the meeting terminated.

An out-door meeting was held in August, when the Association journeyed by rail to Tyntern, meeting some members of the Cheltenham Society, by pre-arrangement, at Chepstow. The total number was not very large, but everyone present came prepared for work, of which a good amount bid fair to be done, ranging from 10 by 8 to 7 by 5, by both wet and dry processes. However, hardly had everybody got fairly into harness and made a few negatives, when one of the "blue mists" which thunder-weather generally spreads over the luxuriant verdure of Tyntern enveloped everything, and work was practically put an end to. The commissariat department was then carefully attended to at that most charmingly situate little hotel, "The Beaufort Arms," after which all re-journeyed towards home, the "dry men" anxiously awaiting the results of "development," and the wet men thankful for the little they had.

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Talk in the Studio.

South London Photographic Society.—The Annual Technical Exhibition Meeting of this Society will take place on Thursday evening, November 14th, in the large room of the Society of Arts, Adelphi. Communications may be addressed to the Hon. Sec., 57, Queen's Road, Peckham.

Swan's Dry Plates.—A correspondent, Mr. J. A. Smith, of Rotherham, sends us a couple of fine transparencies printed on Swan's dry-plates by candle light. The colour and quality are exceedingly good. Mr. Smith speaks highly of the excellence of the plates, and the ease with which they develop.

The Velocity of Light.—One of the most important papers read at the recent meeting of the American Association was that by Albert A. Nicholson, of the United States navy, on experimental determination of the velocity of light. He said:—"The two methods by which the velocity of light was determined experimentally gave in the hands of Foucault and Cornu results which differ by nearly ¦ one per cent. To find the correct result is the object of the experiments I have undertaken. The method which I have adopted is essentially that pursued by Foucault, but has this important advantage, that it permits the use of any distance between the mirrors. This is accomplished by using a lens of great focal length, which collects the light from the revolving mirror into a series of parallel pencils, which are reflected back from the surface of a plane mirror. The distance between this and the revolving mirror in the preliminary experiments was 500 feet, and the displacement obtained was 0·63 of an inch—about 25 times that obtained by Foucault. The apparatus used was adapted from the material found in the Naval School, and the experiments were performed under difficulties. The following is a table of results:—186,730; 188,820; 186,330; 185,330; 187,900; 184,500; 185,000; 186,770; 185,800; 187,940; 186,508 mean. 186,600 Cornu. 185,200 Foucault."—*Scientific American.*

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To Correspondents.

Wallington (Stoke).—The process of cleaning engravings requires great care, and, if managed skilfully, old prints may be made to look as good as new. Take a mixture of chloride of lime half a pound, oxalic acid two ounces, and a quart of water. Place the engraving on a smooth clean board, and first sponge on both sides with clean water, then with the solution. As soon as the spots disappear, sponge freely with cold water to remove any traces of the cleaning solution.

Leon.—We are sorry that you should take so little care of your copies of the News as to permit them to be torn up, and also sorry that we cannot efficiently help you in the case. You would not, we think, serve your Year-Books so, and if you have the Year-Book for 1868 properly preserved, you will find full instructions there for producing transparencies by the wet process. If you know a dry process, you may produce them still more simply, by exposing a dry-plate under a negative for a second or two, and then developing. You can scarcely hope that we can comply with your request to write you the instructions, a task which would involve some hours' labour. We have not time, indeed, for answering any of the correspondents of the News by post.

Beginner.—The general proportions for an enlarging camera must depend on the sizes to which you wish to enlarge—from what sized small negative. We can, however, give you a few general hints. To copy a picture the size of the original, the camera must be extended just double the focus of the lens. Hence, if you use a lens of ten-inch equivalent focus, your camera must be extended twenty inches. If you wish to enlarge to double the size, you must extend ten inches more—that is, to thirty inches—and so on in proportion. As regards the stop, use that which gives you good definition all over the plate. This will be best ascertained by trial. The larger stop you can use to secure good definition, the more easily and satisfactorily you will work.

Darlot's Lenses.—We learn from Mr. C. E. Elliot, of Jewin Street, that he is agent in London for these lenses, and can supply our correspondent who enquired regarding them last week.

H. S.—A quick-acting portrait lens by either of the makers you mention will serve, using one of as short focus as possible, without losing good definition. A lens of long focus is very undesirable in dull weather, not simply because it works slowly, but because, requiring a greater space between the camera and sitter, a mass of misty dull atmosphere intervening causes the effect of fog.

H. Dixon.—Thanks for your communication. We will note its contents. We were certainly under the impression that the enlargement was the work of the Company. The work is very good.

H. S.—The nitrate solution gathering in drops and streams on the plate is due to the repellent character of the collodion film. Age will cure it, and there is no other certain cure that we know. Immersing the plate as soon after the collodion is set as possible is an aid in preventing. Try mixing some old powdery collodion with the new. The granular deposit is generally due to supersaturation of the bath with iodide of silver. Add some new uniodized bath to the solution. The lighting in card enclosed is very good.

R. Gordon.—Many thanks.

Several Correspondents in our next.

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METEOROLOGICAL REPORT FOR SEPTEMBER.

BY WILLIAM HENRY WATSON, F.C.S., F.M.S.

Observations taken at Braystones, near Whitehaven,
36 *feet above sea-level.*

Date.	Barometric Pressure.			Temperature in the Shade.			REMARKS.
	Morning	Noon.	Night.	Morning	Noon.	Night.	
1	29·85	29 90	30·05	59°	62°	51·5	Fair and bright
2	30·08	30·08	30·00	63	68	62	Fair, bright, and clear
3	29·99	29·99	29·99	63	65	63	A little small rain a.m.
4	30·04	30·03	29·97	65	70	66	Fair and sunny, but hazy
5	29·89	29·89	29 88	66	71	63	Fair and sunny, but hazy
6	29·90	29·93	29·94	64	68	63	Fair, rather gloomy
7	29·99	29·99	29·98	62	65	60	Fair, rather bright
8	29·92	29·90	29·89	65	69	61	Fair, but gloomy
9	29·81	29·85	30·00	62	65	56	Rain a.m., but fair and bright p.m.
10	30 08	30 10	30·09	62	64	58	Fair and sunny
11	30·08	30·08	30 00	62	66	63	Fair and sunny
12	29·89	—	30·05	58	66	55	Heavy rain this morning. Fair and bright the rest of the day
13	29.99	29·93	29·87	58	63	61	Fair, generally sunny
14	29·79	29·81	29·74	63	66·5	62	Rain this morning and evening
15	29·50	29·13	29·18	62	62	54·5	Heavy rain and strong wind a.m. & p.m.
16	29·38	29·55	29·76	56	56	58	Showers with strong wind a.m. and p.m.
17	29·63	29·63	29·48	63	64	60	Wind all day with occasional showers
18	29 52	29·60	29·60	59	65	59	Fair, but gloomy
19	29·54	29·55	29·62	49	62	60	Rain this afternoon
20	29·70	29·75	29·80	46	59	48	Fair, generally bright
21	29 72	29·68	29 60	56	62	49	Fair and sunny
22	29·56	29·40	29·36	56	56	60	Rain a.m. and p.m.
23	29·28	29·30	29·38	48	56	47	Rain a.m. and at night
24	—	—	29·54	52	57	[illegible]	Fair, but cloudy
25	29·37	29·48	29·59	58	—	53	Heavy rain this morning
26	29·68	29·68	29·79	55	58	56	Showers a.m. and p.m.
27	29·82	29·87	29 92	57	69	57	A little rain this evening
28	29·89	29·89	29·90	59	65	60	Very small rain this evening. Foggy
29	29·89	29·80	29·74	61	63	59·5	Very foggy a.m. A little rain at night.
30	29·57	29·62	29·78	57·5	57·5	53	Rain a.m. Rather foggy

Summary.	Mornings.	Noons.	Nights.
Highest temperature observed	66°	71°	66°
Lowest ditto	46	56	47
Mean ditto	58 8	63·2	56·8

Mean of all observations	59·6
Number of fair days	14
Number of fair days bright	10
Number of fair days gloomy	4
Number of days on which rain fell	16

The Photographic News, November 1, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Last of the Paris International Exhibition.

"All prizes and no blanks." The French are not only polite, but, as everybody knows, they are capital business people into the bargain. How pleasant it must be to look over the list of the awards of the Paris Exhibition and find yourself down as worthy to to be mentioned honourably, or as having gained a medal. If we had only sent something, our name too might have appeared upon the glorious roll. Certain it is that most of those who did exhibit, and did gain distinction, will send again, and thus contribute once more to the success of a Paris International Exhibition. The system adopted by the Paris Commissioners may not be altogether a new one, but it is decidedly sound from a business point of view. In this country it is usually adopted by private scholastic establishments. Master Percy Jones brings home two prizes at midsummer, and his younger brother actually three. What can give Mr. and Mrs. Jones more delight than to know that their sons have so distinguished themselves? The gilt-bound volumes are laid upon the drawing-room table with especial pride, and duly exhibited to the Smith and Brown families when these call. And papa and mama are still further delighted when the Christmas holidays come round, and the boys do it again. Once more they come home laden with rewards, and once more paterfamilias congratulates himself that the boys are at a capable school and distinguishing themselves. Master Percy this time has two books—not for classics or mathematics, but because he is the sweetest-tempered boy in the school, and because his conduct is moral. Could anything be more gratifying? Of course Mr. Jones keeps his boys at the school as long as he is able, and the master continues to spend ten shillings, out of the sixty or eighty pounds that he receives annually, upon gaudily-bound books for prizes; it is the best and cheapest advertisement he could possibly adopt. When we were at the Paris Exhibition, we went very carefully over the pictures of British exhibitors; but on referring to our note-book, the other day, we could only find twenty-eight names. The number of awards made by the jurors is thirty-four, so that it would seem that every exhibitor got one, and there were six over. We know a volunteer officer who once gained a prize for shooting —not simply for blank firing, but where you put in a bullet and gunpowder, and have to fire it off yourself. At first we thought the affair was all brag on his part, but once he actually showed us the prize, a set of seven razors, one labelled for each day in the week, so you could never make a mistake as to which you were to shave with.* Well, he gained the distinction something after the manner of the Paris awards. He told us there were but ten prizes, and seven to shoot for them, and in the end he came off with one of them. There were five shots at the target, and he only missed twice—such was his account—and hence the honorable position that he attained to. But there is something more than the awards themselves, for which everyone must feel grateful to our Paris neighbours. As we have said, they are nothing, if not polite. If you go to a Paris theatre now-a-days, and pay but a modest two-franc piece for your seat, you do not simply get a ticket with a low name upon it, such as "pit" or "gallery." Not at all. For your two francs, or thereabout, you can choose from a host of places all having high-sounding titles. "Troisième loge de coté," for instance, or something like "avant scéne de quatrieme," are set down for choice, and very cheap such places seem for the money. Of course, if you are a vulgar Briton, you will probably use bad language when you are shown a dirty narrow seat in the ceiling of the house, whence you cannot look down without feeling giddy. You won't stand this long, in all probability, and go to the bureau of supplements, as it is termed, to purchase a better ticket. "Stalles" are but five francs, and so you purchase a stall, but, to your chagrin, this only admits you to a sort of back pit under the dress circle, where you can only see a third of the way up the curtain, and where the heat and stuffiness are insupportable. "What they call the seats in front?" you ask. "Stalles d'orchestre," you may be told, and you pay a second visit to the supplement bureau. The payment of two more francs makes you a happy man, and you make your entrance once more. But still you are far away from the stage, and the orchestra is divided from you by a dozen rows. You naturally invite a further explanation, and then arrive at the knowledge that the front rows of seats are dignified by the grand title of "fauteuils d'orchestre." It may be absurd to be continually aggrandizing one's names, and employing "fauteuil" for cane-bottomed chair, but these things are inseparable from our polite neighbours. "Sardines à l'huile," Englishmen should remember are only "sprats in oil," as Mr. Toole says, and we dare say those of our brethren who have been fortunate enough to gain distinction at the Paris Exhibition will take the awards at their real worth. They are "pretty compliments," but they are little more. We congratulate Mr. H. P. Robinson on his gold medal, although it is no novelty for him, as we know, to receive medals, even of that costly nature; and to Mr. Vernon Heath we also offer our felicitations, the golden award in his case being, we believe, the first of its kind. Mr. Dallmeyer and Mr. Ross will not receive much more kudos or custom from the fact of their having taken gold medals, since their high reputation is already firmly established. Mr. Slingsby, Mr. Payne Jennings, Mr. William Bedford, Mr. Faulkner, Messrs. Elliott and Fry, the Autotype Company, Messrs. Mawson and Swan, and M. Leon Warnerke, were all fully entitled to a silver medal, if they were entitled to anything. We suppose that in each class a certain number of medals were at the disposal of the jurors, and these were distributed as evenly as possible, while the rest received honourable mentions only, simply because there were no more medals to give them. Just as readily, we are sure, our French neighbours would, as politely, have presented all with gold medals. We may clearly take it that they had the will to do so; or, failing this, at any rate, make every exhibitor a Chevalier of the Legion of Honour. With the announcement of the awards the world's show will come to an end, and it is a satisfaction for Englishmen who have helped so much towards its accomplishment that the Exhibition has proved a commercial success. After the failures at Vienna and Philadelphia, people naturally began to think that the days of international exhibitions were numbered. That at Paris has proved the contrary. But it seems pretty certain that only in a commercial centre like London, or a pleasure centre like Paris, can success be depended upon. A world's show at Berlin, for instance, would hardly ensure success any more than one at Vienna. There is not a sufficiently rich population in the vicinity of those cities, and they are too far off for the casual visitors from Great Britain, France, and America. Much as she would wish it, Prussia or North Germany could not follow the example of her vanquished enemy, and organise a prosperous international exhibition. For that reason, possibly, she did what she could to jeopardise that of her neighbour by not supporting it officially. It was only at the eleventh hour, when Paris had success almost within her grasp, that Germany consented to honour the affair with her presence. Her support had little effect upon the Exhibition; but had the German Government remained obdurate, we should have missed the grand collections of paintings contributed at the last moment by the Fatherland.

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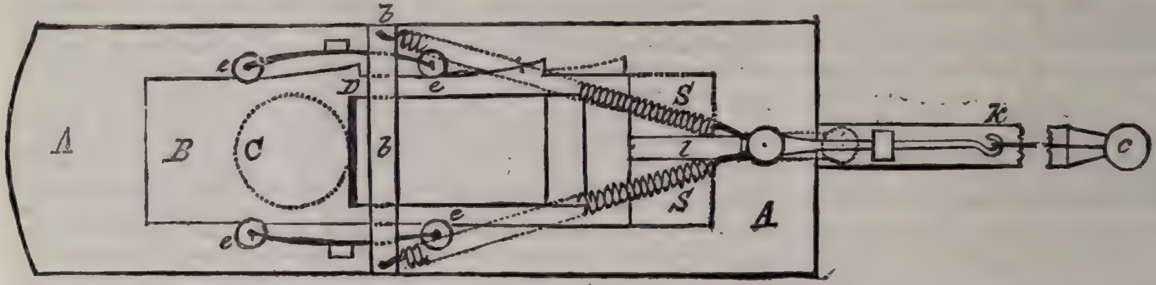
* It pleased our friend mightily, the stropping up and arranging of these razors, whenever he had a spare moment.

JANSSEN'S NEW METHOD OF SOLAR PHOTOGRAPHY.

BY H. F. BLANFORD.*

The photo-heliograph employed was constructed specially for the Meudon Observatory by M. Prazmouski, of Paris. It has an object-glass of five inches diameter, and a reversing ocular, giving an erect image on the sensitized plate. The finding telescope casts an image on a disk of ground glass, by observing which the operator can judge the exact instant for releasing the sliding screen, which causes the instantaneous exposure of the sensitized plate. At present the position of the telescope is adjusted by means of winches worked by hand. The construction of the sliding screen, on the accurate adjustment and working of which the success of the operation mainly depends, will be understood on reference to the accompanying rough diagram (which, however, is not drawn to scale, and in which, to avoid confusion, some of the minor datails are omitted). A A is an oblong brass plate which serves as a frame for the mechanism, and is introduced through a slit in the side of the telescope, exactly at the spot where the real image is formed by the object-glass. At the spot where the image falls, the plate is pierced with a circular aperture, somewhat larger than the image shown by the dotted circle C. But this is completely covered by the sliding screen B, excepting such portion as is momentarily uncovered by the transverse slit D, in its passage across the image. The width of the slit D can be varied by means of a micrometer screw, which is omitted in the diagram. The sliding screen works between four small grooved wheels *ee*, fixed to curved springs, which press them against the edges of the screen-plate; and one of these edges is shaped in the manner shown in the diagram, so that the pressure is increased from the instant at which the slit D reaches the margin of the circular aperture C, neutralizing the acceleration of the movement by the continued action of the springs, and rendering it uniform during the passage of the slit across the image.† Thus the image is allowed to fall on the sensitized plate, not as a whole, but in successive slices, and the width of the slit is so adjusted to the rate of motion, that each slice is exposed during from $\frac{1}{2000}$ to $\frac{1}{3000}$ of a second only. The motion of the screen is effected by three spiral springs, two of which, S S, are shown in the diagram (the central spring being omitted). The fixed ends are attached to a bar, *b b*, screwed to the slide A A; the free end to a stud on the bar *l*, which projects from the proximal end of B, is bent twice at right angles and terminates in the hook *k*. In setting the screen before operating, a loop of twine is passed over the hook, which is then drawn towards the clip *c*, extending the springs S S, and bringing the screen into the position shown by a dotted line on the diagram. The twine is made fast in the clip *c*, and all is in readiness for the operation. At the critical moment, the retaining string is cut, and the slit D is rapidly drawn by the tension of the springs across the film, till checked by a stop not shown in the diagram. The movement of the screen is generally horizontal, but a gravity compensation is attached which can be employed when the movement is vertical.



The rate of the movement, and the uniformity of the motion are determined by attaching, by means of wax to any part of the sliding screen, a glass slip coated with lamp-black. A tuning fork with an attached bristle being made to vibrate transversely to the movement of the screen, the latter is released as in the actual operation of photographing, and the length of the wave marked by the bristle on the carbonized surface, multiplied by the width of the slit D, and divided by the number of vibrations of the fork per second, gives the duration of the exposure; while the uniformity of the movement is tested by the equality of the wave-lengths, which correspond to the passage of the slit D, across the circular aperture C By this means, the uniformity of exposure can be regulated to $\frac{1}{10000}$ of a second.

In order to obtain the exact position of the sun's axis on the plate the instant of the exposure is noted by the chronometer, and the exact level of the slide containing the sensitized plate is observed with an accurate clinometer before removing it from the camera.

As M. Janssen has pointed out, the chemical preparation and development of the plate require very great care, in order to obtain the requisite sharpness of detail. The gun-cotton for the collodion is prepared at a high temperature (70° C.), and numerous precautions are taken to ensure that the collodion film shall be perfectly even, and free from the smallest speck of foreign matter. The image is developed gradually, beginning with a solution of ferrous sulphate, and after thorough washing, completing with a solution of pyrogallic acid, after which the image is strengthened wilh a mixture of pyrogallic and silver nitrate solutions.

In a favourable state of the atmosphere, the pictures thus obtained leave nothing to be desired in point of sharpness and definition of detail. But, as a matter of course, all states of the atmosphere do not permit of equal success, the process being subject to the same atmospheric contingencies as in all astronomical work with the telescope. The best results were obtained in the late autumn, and during this last spring.

The character of the photospheric surface as displayed in the new photographs will be best described in a translation of M. Janssen's own words: "The photographs show that the solar surface is covered everywhere with a fine granulation. The forms, dimensions, and arrangement of the granular elements are very varied. Their size varies from some tenths of a second to three or four seconds. The shapes are circular or elliptical, and more or less elongated; but often these regular forms are more or less distorted. The granulation is exhibited everywhere; and, at first sight, it does not appear to present a different constitution towards the polar regions. But this is a point to be further investigated. The illuminating power of the granular elements, taken separately, varies much; they appear to be situated at different depths in the photospheric layer. The most luminous of them, those which more especially contribute to the luminosity of the photosphere, occupy but a small fraction of the surface of the sun.

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* Continued from page 507.

† This, M. Janssen suggests, may be otherwise effected by an arrangement which will arrest the action of the springs at the instant when the slit reaches the margin of *c*.

"But the most remarkable result yet obtained, and which is exclusively due to the employment of the photographic method, is the discovery of the photospheric network (*reseau photospherique*). An attentive examination of the photographs shows that the photosphere has not an uniform structure throughout, but is divided into a series of figures, more or less distant from one another, and exhibiting a special constitution. These figures generally have rounded contours, but also often rectilinear and sometimes polygonal. Their dimensions are very variable, and they sometimes attain to a minute or more in diameter. While, in the intervals between these figures, the grains are distinct and definitely bounded although of very variable size; in their interior, the granules are half obliterated, drawn out and confused; most frequently, indeed, they have disappeared, giving place to trains of matter which replace the granulations. Everything indicates that, in these spaces, the photospheric substance is subject to violent movements which have confounded the granular elements. . . . This fact enlightens us as to the forms taken by solar activity, and shows that this activity is always very great in the photosphere, even though there be no spot visible on the surface. I will further draw attention to this very important fact, of which very distinct evidence is furnished by certain photographs, viz., that numerous very dark points appear in the regularly granulated tracts, indicating that the photospheric layer can have but a very small thickness."

In another paper, M. Janssen deduces some further conclusions of interet. He observes:—

"If the solar layer which forms the photosphere were in a state of repose and perfect equilibrium, it would result, from the fact of its fluidity, that it would form a continuous envelope around the solar nucleus. The granular elements would be confounded together, and the lustre of the sun would be uniform in all its parts. But the ascending gaseous currents do not admit of this state of perfect equilibrium. They break up and divide the fluid layer, escaping at a great number of points. Hence results the formation of the granular elements, which are but so many fractions of the photospheric envelope, and which tend to take a spherical form, in virtue of the gravity of their constituent parts. . . . But even this state of equilibrium of the individual parts is but rarely realised; in numerous points, the currents drag along with them the granular elements, and these latter lose their spherical form, and eventually become no longer recognisable where the movements are most violent. . . . Moreover, in the regions of relative calm, the movements of the photospheric medium do not allow the granular elements to arrange themselves in an even layer, whence results the greater or less immersion of the grains beneath the surface, and consequently, owing to the great absorptive action of the medium, the great differences of their lustre shown in the photographic pictures. . . . We may further conclude, from the fact of the relative rarity of the most luminous grains in the photographs, that the illuminating power of the sun is due principally to that of a small number of points on his surface. In other words, if the solar surface were completely covered with granular elements of equal brilliancy with these, its illuminating power, according to a first approximate estimate, would be from ten to twenty times greater than it is. It will be interesting to ascertain, at the next epoch of sun-spot maximum, whether the brilliant granules occupy a relatively larger proportion of the solar disc than at the present time. The direct evidence which such an observation will afford on the important question of the periodic variation of solar radiative intensity, a question on which much diversity of opinion still exists, will be of the highest value.

PRESS NOTICES OF THE PHOTOGRAPHIC EXHIBITION.

(*From the* South London Press.)

If the Photographic Exhibition now on view at 5a, Pall Mall East, contains no startling novelties, it also contains less to which exception can be taken than any previous collection. There are few or no "monstrosities," such as photographers once deemed the highest point of photographic art; mere size is no longer put forward as a quality deserving commendation, while, taking the exhibition as a whole, there is a higher average of artistic excellence than we remember. The collection must be pronounced to be stronger in landscapes than in portraiture, and in the latter department we miss the names of Mr. Valentine Blanchard, Mr. H. P. Robinson, and some others who have heretofore exhibited. There is, however, much good work, and the specimens in portraiture of Mr. Boucher (Brighton), the charming collection of children's portraits of Mr. H. Faulkner (Bayswater), and the clever character studies of Mr. H. Garrett Cocking (Lee), go far to redeem shortcomings elsewhere. A very significant feature in the exhibition to a photographer is the exceedingly large number of specimens of "dry-plate" work. To explain the difference between the "dry" and "wet" processes would necessitate a dive into technicalities which the unphotographic reader would scarce comprehend; we may therefore only say that a perfect "dry" process, owing to its greater convenience, has long been a desideratum, but that hitherto in point of quality of results and rapidity of action all dry processes have had to yield to the "wet," which is, and has been, in general use in the studio. The number of specimens of various dry-plate processes shown this year, and in nearly every instance of great merit, is, however, very significant, and we cannot doubt that ere long this important problem will be satisfactorily solved. Descending to details, we may mention that of South London exhibitors the pictures of Mr. Payne Jennings, of Rosendale Villas, West Dulwich, are deserving of the highest praise. In attempting to illustrate the poets by pictures direct from nature he has set himself a difficult task, but in every instance the difficulties have been successfully overcome. His "illustrations" to Tennyson and Longfellow are exquisite in treatment and manipulation, and we cannot but think that Mr. Jennings' experiment has opened a way for artistic photography to which practically there is no limit. Mr. Jennings' other efforts, his instantaneous sea effects (medal), his dry-plate work, are all deserving of praise. Mr. Garrett Cocking (Lee) is another exhibitor who is making steady progress. He shows two excellent portraits of Miss Amy Roselle and Madame Rose Hersee, an effective study which he terms "La Gitana," and a capital *genre* picture representing a scene in "A Husband in Clover." The arrangement, accessories, &c., of the latter have been well thought out, and the result is exceedingly praiseworthy. The opaline pictures of Mr. Hemery, of Hanover Street, Peckham, are remarkable for softness and delicacy, and are in every way charming specimens of photography. Mr. J. H. Ritchie, Cedar Road, Blackheath, has some clever landcapes. Mr. R. V. Harman, of Bromley, also shows two effective views. We have not space to enumerate the general exhibitors in detail, but we may mention the specimens of Mr. W. England, Mr. W. Bedford, Mr. H. Cooper, Mr. R. Faulkner, Mr. Boucher, Mr. Slingsby, Captain Abney, Mr. Vernon Heath, &c. An interesting collection of Swedish and Russian photographs, lent by Mr. Warnerke, of Peckham Rye, should also not be overlooked.

From The Queen.

The exhibition of this Society at 5a, Pall Mall East, affords, we are inclined to think, but little opportunity for congratulation, and we fail to see marked improvement in any of the branches of the art, from the examples here collected. The large portraits are, as they have ever been, conspicuous failures, so that one fears the very nature of the art itself prevents any exhibition of the higher qualities of the art of portraiture. The portrait of Mr. Hook, R.A. (19) and the "Portrait of a Lady" (59) (the latter a gigantic likeness of the lady whose portrait haunted us over and over again in the summer Royal Academy Exhibition), both by Lock and Whitfield, and of Mr. Irving the actor (130), by the Woodbury Company, are examples of what we say.

Of the more successful smaller portraits we may refer to the male study called "Meditation" (107), by John Chaffin and

Sons; "Portrait of a Gentleman from Life" (126), by Mons. A. Boucher; and "Portrait of a Lady," by R. Slingsby. Among the higher class landscapes are the Scotch scenes, Nos. 10 and 11, by Vernon Heath; "Above the Cascade, Virginia Water" (31), by Captain Rawes; "Windsor Castle" (91), by the Autotype Company; "Graem's Dyke, Harrow Weald" (residence of F. Goodall, R.A.) (122), by F. Downer; and (Views) (231), by S. Wolstenholme. Of animals, the photograph of cows on the river bank, from Basil Bradley's painting, "July on the Thames" (101), by John Hubbard, and studies of animals at the Zoological Gardens, "Animals" (111), by Henry Dixon, are striking examples. Quite a feature, and by far the most interesting portion of the collection, are the large number of Russian and Swedish photographs lent by L. Warnerke, illustrating the in and out door life and architecture of the countries. The sumptuous luxuriance of the palaces is finely shown in "Interior of Imperial Palaces" (39), by Classon; the peculiar characteristics of the scenery in "Views of St. Petersburgh and Peterhoff" (37), by Felish, and "Views taken in various parts of Russia" (38), by W. Carrick; and the manners, customs, and peculiarities of the people in "Characters (192), Study of Figures, Groups, &c.," in various parts of Russia, by Carrick, and "In Nijny Novgorod, Portraits and Groups" (20), by Karelin.

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REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

The author proceeds to discuss the behaviour of gelatine with various reagents. As regards chrome-alum, he finds that a solution containing from twenty to thirty per cent. of gelatine is thickened by an admixture of that substance, and sets very quickly: a more dilute solution (from five to ten per cent.) is not visibly altered, and does not set quicker than pure gelatine. Such a mixture of gelatine and chrome-alum dissolves slowly in boiling water immediately after it has set, but after the lapse of some hours it becomes only soluble by long boiling. When the jelly is digested for some days in cold water, it gives off a small quantity of chromium oxide, but a larger amount of potassium sulphate; and if the water in which it is digested be made weakly ammoniacal, the solution will take up a considerable quantity of sulphuric acid, while hydrated chromium oxide remains combined with the gelatine. A compound of gelatine with the oxysalts of chromium, or with hydrated chromium oxide, is insoluble in hot water.

A very slight addition of chrome-alum is enough to render gelatine insoluble, though the mixture ultimately yields to continuous boiling. But the greater the proportion of chrome alum added, the greater is the capability of resistance to the boiling process. If gelatine, that has been acted on by chrome-alum be thoroughly dried, it is able to withstand boiling water much better than the jelly; but the most insoluble mixtures cannot in the end resist continuous boiling in water extending over days together. As the amount of chromium oxide contained in it increases, the gelatine is rendered less susceptible to the action of boiling water.

Dilute and hot solutions of hydrochloric, sulphuric, and nitric acids promote the solubility of the set mass of gelatine and chrome-alum: a hot solution of potash or of soda, even when very dilute, acts similarly. Strong chlorine water, even when boiling, produces little or no effect, and calcium chloride only a slight one. The solvent action of the boiling water is greatly increased by the addition of potassium permanganate, but this is only a secondary result of the decomposition of that salt into peroxide of manganese and potash, the latter of which, as stated above, acts very energetically.

The addition of chrome-alum to chromatised gelatine in the collotype process is recommended from many quarters, because, while not in any way depriving the film of sensitiveness, it renders the latter tougher and better able to withstand mechanical pressure and friction; at the same time, though making the chromatised gelatine difficult of solution in boiling water, it does not entirely deprive it of its capability of absorbing water. According to Waterhouse collotype films containing a large quantity of chrome-alum are sufficiently hard, but are apt to break away from the glass plate, and on that account he preferred to employ a varnish and bichromate of mercury. Collotype plates painted or drawn on with a solution of chrome-alum will in those spots take up ink, so that the former substance can be used for retouching.

But all the advantages derived from the addition of chrome-alum are neutralized by the circumstance that chromatised gelatines which have been thus altered can only be preserved in good condition for a very short time, owing to their rapidly becoming insoluble. It is, moreover, very difficult to succeed in finding the exact proportion of chrome-alum to be added, for a very slight excess makes the whole surface alike, equally ready to take up the printing ink, so that dull and washy prints are produced. The author prefers, therefore, to do without chrome-alum entirely, and to preserve as far as possible the solubility of the gelatine film. By experiment it becomes easy to choose a very resistant gelatine, from which a large number of proofs can be taken, and which is far superior to other kinds that are hardened with chrome-alum.

In the principles above described, we find the explanation of the fact that a potassium chromate bath which has been a long time prepared is not a good one for sensitizing carbon tissue. Old chromate baths that have been often used turn brown, owing to the formation of chromium oxide. A solution of this kind produces the same effect as one of chrome-alum, for the active principle of the latter substance is also chromium oxide. The rule laid down, when the carbon process was first introduced, directing the chromate bath to be thrown away after every time of using, certainly went too far; but it is invariably necessary to renew the bath so soon as it begins to turn brown and to lose its golden colour.

Common or potash alum has a similar (though less energetic) reaction to that of chrome-alum; it thickens the gelatine, causes it to set easily, and makes it less soluble in hot water, and on this account it is used in the carbon process to fix the images obtained on the tissue. Alum is also used for hardening transfer paper, as well as for rendering more durable the gelatine in drawing off the collodion negative from glass. In photographic operations, however, where it is necessary to have a chrome-gelatine that is completely soluble before exposure, the use of alum is injurious, for chromatised gelatine containing that substance is developed in hot water with great difficulty. On the other hand, in the collotype process, writers like Abney and Edwards recommend the addition of alum to the gelatine, in order to increase the firmness and hardness of the film. For the same purpose it may be used in the gelatine of photo-lithographic or photo-zincographic paper; but its employment is accompanied with the same drawbacks as that of chrome-alum, as above described.

Tannin acts more quickly and thoroughly than any other substance in rendering gelatine insoluble; it precipitates the gelatine from a solution in the form of a white opaque mass. Fabrics can be made waterproof by a coat of the insoluble compound of glue with tannin; and the same compound may be used (in electrotyping) for obtaining a mould which cannot be attacked by the copper solution. Like alum and chrome-alum, the employment of tannin has been recommended by several authorities in the carbon and collotype process, but, as it acts even more energetically than those substances in making gelatine insoluble in water, it is held by the author to be rather detrimental than otherwise in all photographic operations. Advantage may, however, be taken of this property of using tannin for retouching collotype plates.

Alcoholic solutions of different resins, gallic and pyrogallic acids, have all been employed for hardening chromatized gelatine in various photographic processes, but the use of them has in recent times been entirely given up. Tartaric acid and potassium tartrate have also been recommended for hardening carbon prints.

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* Continued from page 473.

An excess of alcohol precipitates gelatine from its solution in water in the form of a coherent elastic mass, which swells up in cold, and dissolves in hot water, though not with the same facility as in its original state. Gelatine will not swell up in strong spirits of wine, but will do so slightly and slowly when the same is largely diluted with water.

For this reason, in hot weather, it is advisable, when the gelatine of the carbon paper is liable to deliquesce, to add alcohol to the potassium chromate bath. Carbon paper that has been sensitized in a chromate bath containing alcohol is more permanent, because it dries quicker, and retains less moisture. According to Vidal, carbon pictures after exposure can be intensified by dipping them into alcohol previous to development; the gelatine by this means becomes more horny, and less soluble in water, and, in developing, the tone is better preserved.

If collotype plates, after being exposed, are plunged into alcohol before they are rinsed, they will become more capable of resisting the action of the ink-roller, and of repeated washing. The process of developing a chromo-gelatine will be found to be restrained if alcohol has been mixed with the water; this property is sometimes of advantage.

(*To be continued.*)

PHOTO-COLLOTYPE.

BY CAPTAIN WATERHOUSE, B.SC.*

With the plates prepared as described, we have found that details may be inserted by two or three methods. The first is by writing in the required additions on the dry gelatine surface, using an ink composed of bichromate of potash, either alone or coloured with Indian ink. After the insertion of the additions the plate is exposed to the light for a few minutes to reduce the bichromate, and may then be washed and printed as usual. Or an ink composed of solution of chrome alum may be used, and will not require exposure to light. In some cases the part to be corrected may be washed over with a solution of bichromate of potash, and allowed to dry, and then the required details may be printed in from another negative.

The taking out of details is more difficult, and requires care. It may be accomplished by washing the part with a strongish solution of caustic potash or cyanide of potassium. Should a plate print dirty, it may be cleaned up and greatly improved by being washed with a weak solution of cyanide of potassium; or, better, with a solution of citric acid, which not only clears up plates that print dirty, but at the same time facilitates the inking-in. A weak solution of ammonia is also said to be useful in this respect.

The process just described was found to answer better in Calcutta for line-work than for half-tones, and for the latter, the following formula for the gelatine films appeared preferable:—

Gelatine	1½ ounce
Glycerine	1½ dram
Albumen	1 ounce
Bichromate of potash	40 grains
Chrome alum	7 „
Water	12 ounces

The plates coated with this mixture have to be dried in the dark, but in other respects the operations are much the same.

The processes in which a thick film of gelatine is spread upon a glass plate were found to present in Calcutta many inconveniences in the drying of the films, and the tendency there is in dry weather for the films to peel away from the glass plates and utterly break up and destroy the surface of the latter. There is also the constant risk of breaking the plates in the press. I was therefore led to go back to the old process of Tessié du Mothay and Marechal, in which a thin film of gelatine is supported upon a metal plate, and finally succeeded very well with the following method, which I have fully described in the Year-Book for 1877.

A flat plate of copper, such as used for engraving, is finely grained on its best side, and having been carefully levelled, is washed with warm water, and coated on the grained side, while wet, with a mixture composed of—

Gelatine (Nelson's opaque)	15 parts
Water	100 „
Bichromate of potash	4 „
Formic acid (when the former are dissolved)	4 „

The excess is poured off, so as to leave enough to give a thin even coating. Half an ounce of gelatine is more than sufficient to cover four hundred and fifty square inches of plate.

The plate is then replaced in the drying-box, and when dry is ready for exposure to light in the usual way; but it will be found desirable, in order to secure perfect contact, to transfer the negative film on to the gelatine surface in a bath of alcohol as before described.

Formic acid varies in strength and other properties, and if it should be found that the films made by the above formula are too soft, the plates may be kept a few days before printing. The addition of a very small quantity of tartaric acid (about 1-30th of a part) will improve the film in this respect, and so will the cautious addition of some hardening agent, such as chrome alum, glycerine, glucose, honey, &c.

The printing operations are the same as for the plates already described, but the use of glue rollers and vertical pressure will be found advantageous. The thin films have been found to stand the wear and tear of printing well, and to have no tendency to chip or tear away from the plates.

In all cases where the photographic image is impressed directly on the printing surface, a reversed negative must be used, as before explained, and these are sometimes rather troublesome to produce. I have lately tried whether the use of this reversed negative could not be dispensed with in the photo-collotype process by taking the negative in the usual way direct on to the thick ground glass plate, and then, while still wet and without varnishing, coating this negative with a thin layer of any of the foregoing mixtures of gelatine, either with or without bichromate. When the sensitive gelatine coating is dry, it is exposed to light through the negative on the under side, and allowed to print well through the film. This plan was found to have many conveniences to recommend it, and to answer very well for subjects in line, but not for half-tones. For map-work it has the undoubted advantages of perfect accuracy of scale and the greatest possible sharpness of the image.

The foregoing descriptions will give an idea of these interesting processes, which are now being very largely used for producing photographic prints of all kinds, though, I believe, the successful working of them still presents some difficulties, even in better climates than India. Against their employment for map-work on the large scale there will, however, always remain the impossibility of joining up several sections of a large map on the printing surface, the difficulty of reproducing the finest tints of a shaded map with a perfectly clean white ground, and, above all, the difficulty of making additions and corrections on the plate.

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* Continued from page 513.

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THE PHOTOGRAPHIC EXHIBITION.

IV.

THE portraiture in the Photographic Exhibition now open is disappointing. Not that there is anything absolutely bad amongst the contributions, but because there is so much that is common-place and indifferent. The majority of the contributions are fair typical examples of gatherings from specimen rooms, but nothing more, and they suggest the pernicious prevalence of conventionalism, in pose, composition, accessories, and arrangements. With a few exceptions, all the portraits are alike, and might have been produced in one studio by one person. All smooth, all delicate, all retouched with marvellous skill, in such a style and to such a degree that they suggest a family likeness amongst almost all the models. The effect is, that whilst there is little to find fault with, there is as little to highest praise.

Such a view of the portraiture would seem largely to justify the action of the Judges in withholding the medal offered for portraiture. And yet we regret that the medal was withheld, as there are some to whom we think the distinction might fairly have been awarded. Some years ago, it was common talk amongst disappointed competitors that mere photographers were not competent to award prizes to pictures in which art claims were chiefly conspicuous. To meet the smouldering dissatisfaction of this kind, it was resolved a couple of years ago to invite the co-operation of distinguished painters in awarding the medals; but the issue has, we fear, been even less satisfactory. If the artist element in the juries be more likely to appreciate artistic excellency, it is certainly more keen to detect short-comings in artistic excellence, and less appreciative of technical merits, and less sympathetically tolerant of all defects; and it is, we have reason to believe, chiefly due to this fact, and the influence of this element, that so many medals have been withheld. And, if rumour speak correctly, several of the most able of the photographic jurymen would willingly have found fitting recipients of medals which have been withheld. To the award of one class of medals only, which has much to recommend it, we have heard many attribute the reticence of awards, as the medals which were given to the highest merit could not well be given to inferior claimants. Where, as in Paris, gold medals distinguish the highest qualities in a competing exhibit, and silver medals are given to great general excellence, bronze and honourable mention, it is argued, may be freely distributed even to good intention. But the Paris awards do not appear to have given much satisfaction to those who have received any less than silver. Reasonable men, however, generally accept the decision of the authorities in a competition the conditions and chances of which they have voluntarily accepted. For the photographic exhibition of this year a jury of award was appointed, the fitness of which few would have challenged; and its decision is final.

In dealing with portraiture, we may personally express regret that the work of an artist like Mr. Slingsby was passed over as unworthy of an award. We may, however, add that the contributions he has sent to Pall Mall this year are very few, and not the best work we have seen him exhibit. His contributions are confined to two portraits, or portrait studies. The first (208) is entitled "Satisfaction," and consists of a full-length standing figure of a lady, surveying herself in a toilet glass. The picture, which is about fourteen by eleven, is rich and massive; the composition, and light and shade, are very good. The figure is well posed, and the modelling perfect. The apparent defect which has challenged criticism is found in the fact that the lady's eyes are not really directed to the mirror in which she is supposed to be looking. The other contribution (209) is entitled "Portrait of a Lady," a three-quarter length on the same sized plate as the preceding. The figure is in profile, the face is charming and delicately rendered, the light and shade excellent, the modelling very fine, and all the technical qualities good. Some exception may be taken to the arm and hand, which look long and large, and follow the line of the sitting limbs. Had these pictures received a medal, few would have charged the jury with undue generosity.

Mr. G. Nesbitt also sends some very fine examples of portraiture, as well as good *genre* subjects. Two examples (142) and (202) are interesting as prints from the same negative, one before retouching and one after. We prefer the first. Both are fine examples of portraiture, but it is a pity that either of them bears such a title as "The Brigand," as it is somewhat exasperating to see a well-looking English gentleman, with, apparently, a fair amount of refinement, dubbed with a name suggesting only brutality, coarseness, cowardice, and greed, all the romance with which such works as *Fra Diavola* once invested the name having been dissipated by actual facts.

There is much good portraiture of the class to which we referred as belonging to the specimen room order. Distinguished in this class are many very good portraits bearing the names of Boucher, of Brighton, and Lombardi. Well posed figures, very handsome accessories—sometimes a little too prominently introduced—excellent technical photography, careful and skilful retouching—sometimes in excess—and rich frames, are capital types of high-class commercial portraiture. Both the gentlemen named send frames of very excellent cabinet portraits.

Amongst the most charming portrait studies are the opal pictures sent by Mr. R. Faulkner. These are chiefly portraits of children, a branch of photography which Mr. Faulkner has made especially his own. They are printed, we believe, by the powder carbon process upon opal glass, a method which especially lends itself to artistic treatment, and suggests, if it does not receive, considerable aid from the pencil. The result is, however, altogether delightful. The portrait of Miss Annie Evelyne Pelly (in frame No. 77) is simply exquisite, the little girl being charmingly pretty, and the treatment worthy of the subject. Mrs. Alfred Morrison, and her daughter Catherine, in the same frame, form a winsome group; the lady, a fine example of a sweet-faced gentle and refined young English matron, with a pretty chubby little child. Mr. Faulkner also sends a frame with a large number of small studies of children printed in carbon after the manner of red chalk. Messrs. Lock and Whitfield send some good portraiture; a portrait of a lady (20) on toned opal glass is very effective. Mr. W. Shuter sends some good "chromotype" costume portraits—in many of which he has, however, been considerably handicapped by unsuitable models. Mr. H. Garrett Cocking sends some good portrait studies, of which No. 243

("The Gitana") is the best, a circumstance largely due to the charming and clever model, who personates the gipsy girl with a roguish air and *espiegle* expression, which is very effective. Messrs. J. Chaffin and Sons show several excellent contributions, in which the great merit is manifest of absence of the excess of sophistication too common in much of the work exhibited. No. 107, "Meditation," has some excellent qualities, but is a little too dark, especially the face. No. 114, "Expecting Jack Home To-day," is especially noticeable for the excellence of the background effects of sea and rocks. In the more ambitious efforts, Nos. 203 and 215, "Criticism," and "Visiting the Studio," there are many good qualities, but pictorially there is a lack of unity; the groups want uniting; each picture might be cut in two, and make two good pictures.

Mr. Ezra Greaves, of Halifax, sends some good portraits, taken direct, of a size usually produced by enlargement. They are good throughout, and excellent examples of carbon printing.

The same remarks may be made of works sent by Mr. S. Wolstenholme, of Blackpool. Mr. W. M. Harrison, a name new to us, sends some very good work in portrait studies, also printed in carbon. Mr. W. Cobb sends excellent portraits and studies, chiefly groups of children engaged in childish amusements.

FRENCH CORRESPONDENCE.

Prizeholders at the International Exhibition—Supplementary Exhibition—Photography by the Police—Juice of the Beetroot and Salts of Iron—The Pellet Process—Boivin's Method of Drying Plates—Gelatino-Bromide Process—Chromo-Photography.

The Prizeholders at the Exhibition.—During the last fortnight the great topic of conversation among those who take an interest in the Exhibition has been the distribution of the awards. As far as Class XII. is concerned, it is no part of my duty to defend or to approve the decisions of the Jurors, but as a correspondent I am bound to take note of the disatisfaction with the awards which prevails among the exhibitors in the Photographic Section—a disatisfaction which has recently found vent in loud and repeated appeals for reconsideration. We have had protests written and published, meetings for mutual condolement, and to organize united action; in short, a great deal of noise and outcry. However that may be, whether the complaints are well or ill founded, there can be no doubt that the irritation which is just now so angry and fierce will, in the course of a short time, die away. Of course, in a competition so numerous and important as that established at the International Exhibition, it must be extremely difficult—practically impossible—for every competitor to obtain exactly the award which meets the merits of his case; at the same time, one cannot but feel for the cruel disappointment of those engaged in the front rank of research and investigation, at seeing their works passed over without any appreciation or recognition of their value. In point of number, England has obtained her full share of awards, and this will be acknowledged by every one who has examined the list published in last week's number of the Photographic News. But it must be acknowledged that she has maintained a brilliant position in the great international contest. I feel sure that no one who has visited the Exhibition will deny that the general effect of the works shown in the English department of the photographic section has produced a most favourable impression on all who saw them.

Supplementary Exhibition of Prize-work.—It is reported that after the close of the Exhibition in the *Champ de Mars*, a supplementary exhibition of works to which prizes were awarded will be held in the *Pavilion de Flore* of the Tuileries Palace; the suggestion is, I believe, due to the directors of the *Musee des Arts Decoratifs*. If this idea be carried out, it is probable that the prize-holders in the Photographic section will be invited to send their works, which will naturally find a place in such an exhibition. I take the first opportunity of bringing this project to the notice of the readers of the Photographic News, that they may be able, if they think proper, to make the necessary arrangements beforehand.

Photography in the Service of the Police.—In my various letters I have often alluded to the Photographic Department of the Prefecture of the Police, and of the valuable work that it executes every day. The value of this important auxiliary to the labours of the police agents has become so far recognized that the Government has determined to organize special photographic studios in connection with the administration of the police in all the principal towns of France. Such a department is already in full operation at Marseilles, and I am given to understand that similar ones are on the point of being established at Lyons, Rouen, Lille, Nantes, and Bordeaux.

Action of the Juice of the Leaves of the Beet on the Salts of Iron.—A very interesting communication on the action of the liquid obtained from the leaves of the beet on perchloride of iron under the influence of light was made by M. H. Pellat to the last meeting of the *Academie des Sciences*. The conclusions arrived at by the author as the result of a series of numerous experiments, which he describes in detail, may briefly be summed up as follows. (1). Deprived of the chlorophyl, the juice of the leaves possesses the property of easily reducing the salts of iron under the influence of light. (2). This reduction may also take place in the dry, and with solutions no longer possessing any vital power. (3). It is due to the oxidation of one or more organic substances, such as sugar, tannin, nitrogenous matter, &c., as well as vegetable acids.

Pellet's Process for Copying Plans.—It is well-known that the chemical researches of M. Pellet have led to his invention of a very simple method of reproducing by photography plans, engravings, and linear drawings, by means of the use of iron perchloride and oxalic acid. This method may be briefly described as follows;—The drawing, or the engraving, is traced on thin paper, which must be either already transparent, or must be rendered so, and this is applied to a paper sensitised in a bath composed of

Water	100	grammes
Iron perchloride	10	,,
Oxalic acid	5	,,

It must then be exposed to the light for from one to two minutes in the sun, and from eight to ten minutes in the shade. After removing the original drawing, the paper is plunged into another bath composed of sixteen grammes of prussiate of potash in one hundred grammes of water. The perchloride of iron not acted on by light combines directly with the prussiate, and the drawing makes its appearance at once in the form of blue (prussian blue) lines on a white ground. The print is then well washed, first in water acidulated with hydrochloric acid, and then in pure water alone.

Boivin's Method of Drying Plates.—With reference to the drying of plates prepared with bichromated gelatine, M. Boivin describes a very simple method for effecting that object, which will be found extremely convenient by photographers who do not happen to possess a drying box specially constructed for admitting a current of air. It consists simply in placing the prepared plates in an ordinary grooved box, arranged so as to be capable of being kept level, in the bottom of which is placed a glass dish containing sulphuric acid; one of the well-known properties of this acid is its capability of absorbing moisture. At the same time this system can only be advantageously employed when a large number of plates is prepared at once.

The Gelatino-Bromide Process.—In the gelatino-bromide process the rapidity is so great that the principal danger to fear is an over-exposure; but this difficulty may be avoided owing to the care with which a negative that is imperfect from insufficient exposure can be intensified. One great advantage of the process consists in the fact that the development can be effected after the lapse of a long time subsequent to the exposure. M. Boivin always uses beer in the developer, and finds that it gives very satisfactory results. When the duration of the exposure has been well-judged, the image comes out after from thirty to forty seconds' contact with the developer. It appears sooner when the negative has been over-exposed, and less quickly when the exposure has not been long enough. After fixing and washing, M. Boivin follows M. Arenas, in submitting the image to a bath of alum, as I have already explained in one of my recent letters. As the negative after drying becomes perfectly solid when it has been treated with alum, there is no advantage in varnishing it; but M. Boivin recommends a varnish before printing, when there is danger of moisture and contact with the silver nitrate producing spots on the surface of the plate.

Improvements in Chromo-Photography.—M. Ducos du Hauron, who has recently paid me a visit, has informed me of some new improvements that he has been able to introduce into his process for taking coloured photographs. First, by using an oxalate of iron developer, he has succeeded in reducing considerably the time of exposure necessary for obtaining the three negatives that form the basis of his method. In the second place, as the result of some experiments made by an eminent printer, he finds that each of his three plates can be printed from with colours in the press, instead of being applied to emulsified and coloured paper. The importance of these two improvements from a practical point of view cannot be over-rated.

Ernest Lacan.

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NEGATIVES WITH GELATINE EMULSION.

BY CHARLES BENNETT.

Resuming the subject of gelatino-bromide in last week's issue, we come to faults consequent to indifferent manipulation. Happily the process is simple, and they are easy to overcome.

Frilling is caused by so much emulsion left on the plate; drying in a box where the shelves are too close; the plates made too warm (they should just have the chill off); unsuitable water during development. If the *plates* are at fault, the following will have no effect, but supposing them to be perfect, and frill only from faulty water at development, twenty or thirty grains of Epsom salts to the pint, used in the developing solution, and washing water, will stop it.

Thinness of image from over-exposure, from fog, by stray light, and too closely draining in coating.—It is only necessary to mention these faults to rectify them. If the plates are made properly, intensification is never necessary except in case of over-exposure, when—

Pyro.	2 grains
Saturated solution carb. amm. ...	2 to 10 drops
Water	1 ounce

will give density, and is preferable to silver; but on no account should it be used before the liquor ammonia has done its work, or the details will be suppressed. Should a negative show thin after full details are out—

Pyro	2 grains
Citric	4 ,,
20-grain nitrate silver solution ...	A few drops
Water	1 ounce

will intensify speedily. The negative should be fixed and dried two or three minutes, thorough washing having been observed (use no acetic acid at any stage). Thinness of image may also be the result of partial decomposition of the gelatine (almost always before coating) in which case comets in the direction of the last inclination of the plate at coating will be sufficient evidence of the bromide of silver having ceased to be held in suspension by the gelatine. Decomposition will often be caused by the neck of the emulsifying bottle being under water during the process of emulsifying, the water by means of the varying temperature of the water-bath being frequently drawn into the flask between it and the cork, and contaminating the emulsion; the outside water in the water-bath, being probably common tap water, will be more or less putrid in twelve hours when at blood heat. I have not had one lot decompose, whilst emulsifying, out of at least fifteen little batches made this summer. I believe I have made four or five since the middle of September, and emulsified for seven days each. It is necessary to keep the temperature as steady as possible.

Fog.—Dusky red fog sometimes occurs with the common gelatine, or in overheating the emulsion or plates, or by too much silver. The remedies for the first two faults are simple; and as to the third, in addition to the silver being accurately weighed, and not in larger proportion than eleven grains to seven grains of bromide of ammonium, the latter should be used only in its perfectly dry state, being kept in a stoppered bottle, otherwise it will appear to weigh more than it really does, and consequently throw the proportion of silver higher, and lead to all sorts of faults, red fog especially. Ruby colour fog, occurring in the shadows, is caused only by under-exposure. A plate from the same batch more exposed will not show this, if even the same amount of ammonia in development be used. Guard especially against three faults: stray light, over-exposure, and too much nitrate; and, as to the latter, if an error does occur, let it, if possible, be in favour of too much bromide, as the silver is already as fully employed as the gelatine will allow. A few drops of the bromized gelatine lost before the silver is added will upset the balance.

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AMERICAN MANUFACTURING ENTERPRIZE IN PHOTOGRAPHIC GOODS.

The *New York Trade Journal*, referring to an article in the *Times* on the pre-eminence of American mechanical and industrial arts as displayed in the Great Exhibition in Paris, refers to the Scovill Manufacturing Company as an illustration. It says:—

"One of the most striking instances of how these things are working is in the case of the famous Scovill Manufacturing Company, of Connecticut, who send their goods into Birmingham, in England, the very headquarters of the manufacture of the same goods, and the American goods actually out-sell the English on their own ground. The Company we have mentioned constitute one of the greatest and most influential industrial organizations we have amongst us, the capital invested in the business being no less than $1,000.000, while about 400 hands are employed. The works are at Waterbury, Connecticut, and have a frontage on Mill Street of 800 feet, and the main building is three stories high. No less than $100,000 have been spent on improving the water system within the last few years. The machinery and the different machanical appliances are known to be the most perfect in existence. As a natural consequence, the productions of the Scovill Manufacturing Company rank far above those of all other houses in this line of business, and are sold all over the civilized world, as well as being used to an enormous extent at home. It seems scarcely necessary to refer to the productions of this concern in detail, they are so well known, but we may briefly allude to a few of them.

"An important branch is the button-making department, to which an immense building is devoted. A speciality is made of naval and military buttons, large quantities being made for the United States, the Cuban and the Spanish Governments for their troops. Another department is devoted to making brass butts and hinges, the machines for making which work automatically, and were invented by mechanics in the Company's employ. The department, however, which is regarded as of the most importance, and in which the greatest proportion of the capital is sunk, is the rolling mill, which alone covers 200 by 125 feet of ground. Adjoining this mill is a casting shop, which covers 75 by 100 feet of ground, in which various articles pertaining to photography are manufactured, including the camera-obscura or camera-box, with its various styles of holders and dark slides, and stands for gallery and field photographic apparatus. The principal factory of the Company is that of the American Optical Co., which is the largest in the world. The Scovill Manufacturing Company also own the extensive factory of the well-known Samuel Peck & Co., at Newhaven, Connecticut. The Company are sole agents for the sale of the Phœnix Plate Company's ferrotype plates, on which the portraits of that name are produced. At the Company's warehouses, at 419 and 421, Broome Street, New York—which covers 50 by 109 feet of ground, and is five stories high—specimens may be seen of all their productions, and the testimony of all practical men is that they cannot be excelled."

MOUNTING AND MOUNTING MATERIALS.

The following details appeared in a series of papers contributed to our Philadelphia contemporary under the title of "Photographic Scraps," by John L. Gihon. Mr. Gihon, we regret to add, has recently died. He was a photographer of considerable skill and intelligence, and frequently contributed useful papers to our contemporary. The "Scraps" in question are taken from his note-book, and have been gathered from all quarters. Unfortunately, the authority is not appended, although quotation marks indicate that the matter is to be understood as borrowed. The following, on mounting, will be useful to many readers; although we have a recollection of having published much of it some years ago:—

"Now comes the question as to whether the pictures should be mounted wet or dry, and what particular adhesive material should be used. A happy medium between the two conditions of the paper should be chosen. The photographs should be sufficiently damp to prevent their curling up, and insure their lying flat; they should not be dripping wet. This state can readily be obtained by allowing them to lie for a few moments between wet cloths. All sorts of compositions have been suggested and used, but of them all, the plain starch-paste has remained most in favour.

"From the commencement of the application of our art to wholesale requirements, such as the illustration of books with photographs, it has been a vexatious matter to mount the albumenized prints upon paper sufficiently thin for bookbinders' purposes, without showing a most objectionable and unsightly cockling or drawing of the edges and corners of the supporting paper. The result can be perfectly accomplished, but, unfortunately, the method entailed involves too much labour for the occasion. The following is from one of my scraps, and answers tolerably well.

"'The only mounting material hitherto in use, by which all risk of cockling is avoided, is india rubber in solution, but, unfortunately, it is altogether untrustworthy; sooner or later, the prints are sure to leave the mounts. The cause of cockling in prints mounted on thin boards is, of course, well known. A print treated with starch-paste, gum, or any adhesive preparation of which water forms a large part, absorbs the water, and swells or stretches. If, in this condition, it is attached to a dry board, it contracts again as the water evaporates, and necessarily drags the board to which it is attached out of shape, causing cockling or buckling. The point to be secured, then, is an adhesive substance containing little or no water. India-rubber solution answers this condition, but, as I have shown, it fails in other respects. I am about to describe another preparation which also answers without the disadvantages of india-rubber.

"'A preparation for mounting, the nature of which has been kept a profound secret, has been understood to meet all the necessary requirements. Some hints of its constitution having recently reached me, I have been induced to make some experiments, which have issued very successfully. The new preparation particularly consists of a solution of gelatine or glue in alcohol. This, at first sight, seems to be an impossibility, since under ordinary circumstances gelatine is not soluble in alcohol, but is, on the contrary, precipitated from an aqueous solution by the addition of alcohol.

"'My first attempt to make the preparation was as follows, but was a failure. I describe the failure that it may be avoided: I took gelatine and soaked it in water for twenty-four hours, until it was well swollen; and then, draining off the water, added alcohol, and placing the jar, which was covered up, in a pan of water, put it on the fire to simmer. After the lapse of thirty or forty minutes, the gelatine was softened and melted; but it was but very imperfectly mixed with the alcohol. On adding a little more alcohol, to supply the loss by evaporation, the slight degree of mixture which had taken place was at once destroyed, the gelatine being precipitated as a tough, viscous mass at the bottom of the jar; and no subsequent amount of heat or stirring with a glass rod secured even an approximate degree of solution or mixture. This was clearly a failure, and I began again. As I finally met with success, I will describe precisely what is to be done, giving the proportions of my own experiment, which can of course be easily increased for working on a large scale.

"'Take half-an-ounce of gelatine and cover it with water; leave it to soak for (say) twenty-four hours, in which time it will become thoroughly swollen. Now pour off all the superfluous water, except two or three drachms; place the gelatine with this trace of water in a glue-pot, and put it on the fire. When it is melted, add six ounces of alcohol (that which I used had a specific gravity of .820). A most important point, however, is the mode of mixture; the alcohol must be added a little at a time, stirring steadily with a glass rod, and maintaining a moderately high temperature. By proceeding carefully in this way, perfect mixture is secured; and the solution is then poured into a wide-mouthed bottle, corked or stoppered, and set aside for use. This applied to the print causes a scarcely appreciable degree of expansion, and no subsequent cockling. Its adhesive qualities are perfect, and the preparation keeps well. To prevent the rigid hardness which characterizes good gelatine, I added from one to two drachms of glycerine to the preparation, which is, I think, an improvement. It is probable that any good sample of glue would answer the purpose, and for extensive use would be more economical. At first sight, the use of alcohol for mounting purposes seems costly; but as a little of the preparation will mount many prints, the expense need not be very serious. For mounting photographic book illustrations, I think this will be especially valuable.'

"Amateurs, and others only requiring to mount a print now and then, often find it inconvenient to prepare starch-paste in small quantities; but the following mixture, when once made, will keep for months, ready for use. It is as smooth as oil, easy to prepare, does not thicken, and will stick like glue. It also has the advantage of not cockling the prints so much as the ordinary starch-paste:—

Picked white gum-arabic... ...	½ ounce
Dextrine	2¼ ounces
Liquid ammonia	4 drops
Water	8 ounces

"The gum-arabic is to be pounded in a mortar, and mixed with the dextrine; then rubbed in the mortar, with two ounces of the water, till quite smooth; then the rest of the water added, and boiled in an enamelled saucepan for ten minutes. When cold, it may be put into a wide-mouthed bottle, the ammonia added, and thus kept for use.

"The following plan for cutting out stereoscopic pictures can be recommended to those who have but a limited number of them to issue:—

"The prints may be rapidly and neatly cut by a knife upon a glass plate, using two rectilinear glass guides; one seven and a-half by five inches, and the other three inches square. Let A be the right, and B the lefthand view, as yet attached and untransposed. With the long guide cut the base of both views and the left of B, from which base, with the square guide (which is henceforth used), cut the right of B at the proper distance, then cut the left of A, upon which place B, and having marked off the width, cut the right of A. Super-impose both prints, and cut both tops together. All this is done in less time than it takes to describe, and the result is two rectagular prints exactly alike in size. By doubling up the upper portion of the prints, the four upper corners may be rounded by hand with scissors, which sometimes gives a finish, and removes that which it is not desirable to retain. Before commencing to cut the prints, the right hand view should be marked at the back. The ordinary mounts being rectangular, and twice as long as broad, one may be used to draw a pencil line, dividing the face of the other into two squares.

"In olden times, both plain and albumen photographs were finished by rubbing upon them an encaustic paste, made by melting white wax, and diluting or softening it with a large proportion of spirits of turpentine. A little balsam of fir was added, and the smell of the whole disguised with oil of lavender or kindred scent. This preparation was bottled, and sold by stockdealers and enterprizing photographers at five times its cost of production. Its application to even a rolled print is of advantage, as it thoroughly cleanses the surface of the print, and gives depth and transparency to heavy shadows. The same object is attained by the more lately introduced plan of burnishing. This is accomplished by means of presses that are so extensively advertised as to be familiar to every photographer."

PERSPECTIVE FOR PHOTOGRAPHIC STUDENTS.

BY J. MARTIN.

According to promise, I offer a few hints and observations upon the science of perspective for the use of students in the photo graphic art. As all pictorial representations to be correctly drawn must be subservient to its laws, it is necessary that the student of every branch of what may be termed fine art should have a knowledge of them; but with perspective as practised by the architect, artist, and various other professionals, he has little to do; and therefore he may study the science in a less laborious and more theoretical manner. Preliminary to its study he must make himself acquainted with the names, forms, and proportions of geometrical figures, otherwise he would not understand the terms used. In fact, geometry is really introductory to the science of perspective. This science, speaking as it does entirely of linear forms, is difficult to teach without diagrams; but as these are expensive to produce, and would take up too much room in such a work as the Photographic News, I will endeavour to substitue some familiar objects to help the reader to understand my meaning. Suppose we take the circular face of a watch or dial. This, as everybody knows, is divided into twelve divisions counting the same number of hours. Thus the hour-hand travels round twice a day, and the minute hand twenty-four hours; should there be a second-hand, this will travel round its little dial no less than 1,440 times in twenty-four hours. How perfect must be the machinery which will do this in the same space of time day after day! But to return to our subject. Between each two numbers are five divisions counting one minute each. Now the circle is by geometricians divided into 360°; the number of divisions on the dial are 60, being the number of minutes in one hour. We will suppose each minute division to be again divided into 6, we shall then have the same number of divisions as equals the number of degrees of the geometrical circle, and the hand of the dial having passed from one number to another, marking five minutes' time, will have passed over 30° of space. Now we will apply this to explain the different geometrical lines and angles in a familiar manner. Supposing the hands of the dial to mark half-past twelve, they will then represent a perpendicular line; at a quarter to three, a horizontal line; at ten minutes to four, an oblique line. The line round the whole face of the dial is a circle, half of it the semi-circle. Now, as we have said, each five minutes denote 30°; three times this must be 90, therefore the hands marking a quarter to or a quarter past twelve will comprise a right angle of 60°, being the angle of vision, or that space within the limits of which the human eye is able to see objects at one glance.

The face of the watch or dial is not the only part that can be used to illustrate our subject. For instance, the main spring well represents the spiral line, the wheel round which the chain is wound the cone. Again, we will take the well-known article a gentleman's portable writing desk: here we have a parallelogram, a figure having all its lines an equal distance from each other through their whole length, its breadth and length being also unequal, for if its breadth, length, and depth were equal, it would then be a cube, each of its six faces being a square. Open the desk, and you will then have an inclined plane.

Of geometrical figures, I may mention the far-famed pyramids of Egypt, and the well-known oval bouts which serve as frames to many photo. portraits; the cylindrical tube in which photo. lenses are set, and, descriptive of pyramids, the oval and the cylinder; a cricket ball will serve to give a good idea of a globular figure.

There are cheap and comprehensive works sold at a small cost, which, if the learner wishes to obtain a more perfect knowledge of geometry than the mere name of simple figures, he will do well to obtain Perspective which may be considered as teaching the method of portraying all objects on a plain surface in a natural manner, or, in other words, according to the laws of optics.

The human eye can only see at one glance the extent of an angle of sixty degrees. Birds, and many animals, have a much wider range of vision. Thus, it will be seen that any objects not delineated according to these laws must appear as monstrosities, and I should conclude that the use of any lenses for landscape photography not so regulating is a serious mistake. The science of perspective relates also to the laws of light and shadow, and shows that the earth receives its light from one source only—in the day from the sun, and from the moon at night.

The effects of all artificial light will only influence those objects that immediately surround them, and only in such a degree as corresponds with the darkness of the atmosphere caused by the absence of the two greater lights of the sun and moon. Perspective also gives us the ability of forming a correct criticism of landscape painting, and shows us the position and at what distance to place ourselves before it. To be able to do so, supposing we wish to examine such a picture, let us place it as nearly as possible with the light falling on it from the same side and the same angle, and from the same side as there represented, and in such a position as to be perpendicular with the eye of the observer, having the horizontal line at the same height. Now, by the science that he has acquired, let him find on the horizontal line the point of sight which is always in the picture. Now, at not a less distance than the length of the picture from it, let him place himself opposite the point of sight he has found, and he will stand relative to it at the same point as the artist did when he painted it, and thus only will he be able to judge of its truth correctly. Do not let the learner confound the horizontal line with the horizon. These are never one and the same, except when looking over a wide expanse of water which reaches to the horizon. The tops of mountains often reach far above it, and valleys beneath it. It is evident that there can be but one horizontal line in the same picture. There it is stationary; but when viewing a natural landscape it will vary its height according to that at which the eye of the draughtsman is placed. Thus, if several persons of different height, placed in a row parallel to the scene, were to sketch it, the height of the horizontal line will vary in each picture, and also the point of sight, and this (the latter) more so as they stood wider a part. A line drawn at right angles with the surface of the picture from a point where the receding angles converge on the horizontal line, and would reach the eye of the observer, marks a proper position where he should stand.

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Correspondence.

EMULSION PROCESS.

Dear Sir,—I have lately received so many letters, asking when I intend to publish the details of an emulsion process I have been working for some time, and which gives me almost entire satisfaction, to which I have been unable to reply privately, that I trust you will allow me to say, through the medium of the News, I hope to write a short paper on the subject in time for the meeting of the Photographic Society in December. I must crave the indulgence of many of my correspondents who have not received answers to their questions; but must also hint to some of them that my time is too fully occupied to allow of my writing long letters to *unknown* enquirers.

I may mention that the whole of the pictures I contributed to this year's Exhibition, and which you criticised so favourably in a recent number, were all taken on plates prepared by the process I have promised to publish.—Believe me, yours sincerely, Henry Cooper.

Homehurst, Torquay, October 28th.

DR. VOGEL ON CAPTAIN WATERHOUSE'S METHOD OF PHOTOGRAVURE.

Sir,—Dr. Vogel's article, reprinted in your last, alludes to the above process, already published in your journal. Regarding the large plates made by Goupil, which the Doctor imagines are made by galvanism, as they "cannot be obtained by hydraulic pressure," I may state that these *are* made by pressure, but not hydraulic, that nice truth of surface obtained by hydraulic pressure not being in this case necessary. A rolling press is used, the sheet of lead being passed in contact with the grain relief between a roller and a steel plate. Galvanism is used only to transform this soft surface into a hard steel-faced one of copper. In the earlier experiments with large surfaces, it was found that the pressure necessary to force the whole of the grain relief into the soft metal had one great drawback, viz., greatly elongating the image, and entirely destroying the proportions of the subject. It was then considered necessary by the firm to have constructed an extremely powerful hydraulic press, the expense of which would have been something enormous. Hearing of this at the time, I made a few experiments, and two or three days after showed them that the results could by a modification be quite as well obtained by the simple and comparatively cheap rolling pressure, which is, I believe, used to this day; thus saving what would have been an enormous expenditure by a few hours' careful investigation of the difficulty.

It is my opinion that in Captain Waterhouse's experiments as previously described in your journal, and mentioned by Dr. Vogel, that the granular effect was produced by the alcohol, and not by the tannin at all, the former having the peculiar property of breaking up or dividing the granules of colour held in the gelatine.

Let anyone try the experiment of immersing one half of a freshly-developed carbon print, that has been well washed, in a solution of strong alcohol for half-an-hour, and then drying, and note the difference to the other half allowed to dry naturally. The former will be found to possess a peach-like bloom, which on examination with a powerful glass, will be found to be an extremely fine grain, while the other will have a shiny even surface.

The different colours used in preparing the carbon tissue will also much affect the result—charcoal grey, and madder giving more grain than Indian-ink, &c.

In my experience the addition of tannin has not added anything to the granular effect produced.

Walter B. Woodbury.

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Talk in the Studio.

South London Photographic Society.—The next meeting of this Society will take place on Thursday next, Nov. 7th, in the rooms of the Society of Arts, Adelphi, when Mr. F. A. Bridge will bring before the members "A Curious Incident in Connection with Paper Enlargements."

Photographers Benevolent Association.—The Photographic Exhibition will be open next Wednesday evening, November 6th, from six o'clock pm. to ten, in aid of the funds of the Photographers' Benevolent Association. Admission sixpence to each. Metropolitan photographers may aid the funds and spend a pleasant and instructive evening.

The California Horse—Electric Feat.—We recently published details of the interesting experiment of photographing the paces of a horse, undertaken by Mr. Muybridge. Mr. Rulofson, a photographer of the same city, San Francisco, pooh-poohs the operation, and, writing to our Philadelphia contemporary, says:—"None know better than yourself that the country is full of photographic quacks vending their nostrums, deceiving the credulous, and defrauding the ignorant. California is noted for its 'largest pumpkins,' 'finest climate,' and most 'phenomenal horse' in the world. So also it has a photographer! the dexterity of whose 'forefinger' invokes the aid of electricity in exposing his plate—a succession of plates, so as to photograph each particular respiration of the horse. The result is, a number of diminutive *silhouettes* of the animal on and against a white ground and wall; all these in the particular position it pleased him to assume, as the wheels of his chariot open and close the circuits. All this is new and wonderful. How could it be otherwise, emanating as it does from this land of miracles? Photographically speaking, it is 'bosh;' but then it amuses the 'boys,' and shows that a horse trots part of the time and 'flies' the rest, a fact of 'utmost scientific importance.' Bosh again."

The Latest Likeness of Shakespeare.—A well-known Berlin Shakesperian, a Jew, who not only lectures upon the poet, but makes use of the splendid entertainments given in his popular and hospitable house to do honour to our great countryman, recently appeared at one of his own masquerade festivals in the costume and character of Shakespeare. The work of his intelligent tailor earned so much approval from competent judges that the host, at the wish of several of his guests, allowed himself to be photographed. This costume-portrait of the scholarly Israelite was thought to exhibit so remarkable a similarity to the great Englishman, that some of the adepts to whom it was shown threw out the tempting suggestion that, after a few slight changes had been made, it might be wickedly employed for hoaxing and mystifying the members of the Deutsche Shakespeare-Gesellschaft, who were to meet a few days later at Weimar. The original photograph was retouched with the aid of the best Shakespeare portraits, and a new photograph taken from it. The owner and subject of the portrait carried it to Weimar, and introduced it to the notice of his brother Shakespearians. He pretended that during a recent journey to England he had come across a picture in some out-of-the-way corner, which he took to be nothing less than an original portrait of their great master, and he had procured a photographic copy of it, in order to submit it to their expert investigation. The "discovery" aroused lively interest, and the grave critics passed the portrait one to another, neither of them venturing to utter a definite opinion upon it until it came into the hands of the Shakesperian veteran, Professor Duluis. He looked at it for a few moments in silence, and then suddenly burst out, "Wonderful! wonderful! So even Shakespeare turns out to have been a Jew!" The criminal at once saw that he was detected, and he was obliged to confess, with much penitent humility, that he had attempted to mystify his Shakesperian colleagues.—*Globe.*

Mounting on Thin Cards.—A correspondent of the *Philadelphia Photographer* says:—"I have found out how Goupil mounts photographs without cockling. The print and the mount are wet, the wet print pasted on the wet mount, and then a copper plate is put over the print (I suppose it is a little larger than the print), and the whole is powerfully squeezed together. The plate is then removed, and the mount, &c., dried under pressure.

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To Correspondents.

Acetate Toning.—The toning bath becoming purple is caused by the reduction of gold to a metallic state; toning the solution instead of prints. Just in proportion as the gold is reduced to this state, it loses toning power. When once a gold toning-bath has become inert, it is difficult to restore it. Boiling with hypo-chlorite of lime (common "chloride of lime") is said to restore the activity, by converting the gold again into a chloride.

Charles Reid.—Your question is scarcely clearly and fully enough stated. We presume that you wish to know how much polysulphide of potassium is to be added to a hypo bath to reduce all the silver to a state of sulphide. No precise proportion can be stated, inasmuch as the silver present is an uncertain quantity. You can ascertain when sufficient has been added by taking a small trial portion from the bulk and testing it. Add a little more of the sulphide, and if a further black precipitate is produced, more should be added to the bulk. If no turbidity is produced by adding more sulphide, try adding a few drops of dilute silver solution, and if this produce turbidity, it shows that excess of the sulphide is present.

H. S.—We have generally found the ordinary crystallized nitrate of silver answer all purposes very well. The best way to make a bath is the simplest. Dissolve the nitrate of silver in proportion of thirty-five grains to the ounce of pure distilled water, and add one grain of iodide of potassium to a pint of solution. Almost any of the commercial collodions will answer. That you are using, when sufficiently mature, is excellent. The trouble you described last week is undoubtedly from the collodion, not the bath. Working with an ill-lighted studio late in the day brings troubles that no modification of process or chemicals will overcome.

Q.—A little Castile soap dissolved in alcohol is, we believe, understood to be the best lubricant for applying to cards previous to burnishing.

A Learner.—Your difficulty proceeds from several causes. In the first place, we fear you have not sufficient light in your studio to illuminate the sitter satisfactorily, and this is a difficulty not easily overcome; but it may be partly met. In the first place, bring your sitter, if possible, nearer to the window, and so get a little more light on him. In the next place, use, if possible, a quicker acting lens. Avoid using your collodion too new and thin. A thicker and riper collodion would give you a more vigorous negative. If you had stated the method of intensifying, we might have suggested a modification which would be better. Try the following plan:—After finishing the negative, and washing well after fixing, apply to the negative a solution consisting of—

Iodine	1 grain
Iodide of potassium	2 grains

in an ounce of water. Let it remain a few seconds, then wash well, and apply a solution of—

Pyro	2 grains
Citric acid	2 ,,
Acetic acid	20 minims

to which add about eight or ten drops of twenty-grain solution of nitrate of silver. Pour this off and on until the image is sufficiently vigorous. This plan often gives great pluck to a negative. We appreciate your good intention, but we do not make any charge for advice and information in this column. Write again, and tell us if your difficulties are lessened.

L. C. E.—We cannot undertake the invidious task of recommending special lenses in this column. If you will make a list of those you think of, and add a letter or figure to each, we will indicate by such letters or figure that which we think will suit your work best.

E. Benthin.—The French stereoscopic transparencies are said to be produced by an albumen process, and they have all the appearance of albumen. Ferrier is said to have had a special secret modification of the albumen process. Details of the process alleged to be the secret method used, appeared in our eleventh volume, July 19th, 1867.

Novice.—There are several methods of producing photographs on opal glass, and you do not say to which you refer. State details more fully, and we can help you. If you refer to camera printing on wet collodion, pyro is best for developing. A dilute albumen substratum is useful. Fix with hypo. Always clean the glass.

Dirty Fingers.—The stains produced by silver solutions are doubtless very offensive to a lady amateur, but they may be avoided with care The india-rubber gloves you mention answer well. The worst stains are those encountered in developing and intensifying. To avoid these, it is a good plan to have a piece of thin sheet india-rubber or mackintosh cloth to cover the hand, and hold the plate with the hand so covered.

Photo-Litho.—The process to which you refer of producing red negatives was introduced by Mr. Carey Lea. It is effected by first treating the finished negative with a solution of iodine or a suitable chloride, and following this with a solution of sulph-antimoniate of soda, or Schlippe's salt. This may be purchased or made. To make it proceed as follows:—

Grey sulphide of antimony	1 ounce
Common carbonate of soda	2 ounces
Freshly burnt lime	5½ drachms
Flowers of sulphur	1¼ ,,
Water	8 ounces

A portion of the water is added to the lime, and the whole then placed in a pint bottle and well shaken; then place near the fire, where a temperature of about 140° is maintained, and the bottle shaken from time to time. At the end of about six hours, all appearance of the grey sulphide of antimony is gone, a bulky white insoluble powder remaining at the bottom. The clear, yellow, supernatant liquid, to be removed by filtration, consists of a concentrated solution of the double sulphide of antimony and sodium, or sulphantimoniate of soda: one drachm of the solution in from one to two ounces of water is strong enough for the purpose intended, and giving, with proper preliminary treatment, any colour, from brown to scarlet. The negative may first be treated with a solution of iodine one grain, iodide of potassium two grains, in water one ounce, or with bichloride of mercury. Mr. Lea recommends the following:—

Cold saturated solution of bichromate of potash	3 fluid drachms
Hydrochloric acid	1 ,, drachm
Water	6 ounces

This solution rapidly chlorizes the plate, and prepares it for the sulphantimoniate solution; or if the above be used more dilute, it gives in the earlier stages considerably increased intensity without any after application. The degree of intensity and colour produced by the Schlippe's depends much on the extent to which the action of the iodizing or chlorizing solution is carried. Very great intensity may be obtained if desired. Like all new powers, it must be used with discretion.

Bothered.—There is no enlarging process which, in our estimation, gives better results than the plan of making a transparency by superposition, and from this an enlarged negative. If you wish to enlarge on paper by artificial light, you must of course develop the print. Proceed as follows: The paper should be salted by floating on a solution containing fifteen grains of iodide of potassium and five grains of bromide of ammonium in an ounce of water. The silver bath should contain sixty grains of nitrate of silver and ten minims of acetic acid to each ounce of water, and the paper used immediately after floating on this bath, and whilst it is still wet.

Major J.—We cannot give extended details of Willis's aniline process in this column; but the following is a full epitome. The method is as follows:—Thirty grains of bichromate of ammonia are dissolved in an ounce of water, and two drachms, more or less according to circumstances, of dilute commercial phosphoric acid added. This is applied to paper by floating or sponging; and when dry, the paper is exposed under the *cliche*, which must be a transparent positive, from two minutes to half an hour, according to circumstances. It is then laid in a box about two inches deep, to the inside of the lid of which is fixed two or three layers of blotting paper which are charged with a solution of aniline in benzole. When the lid is closed, the aniline vapour falls on the paper and blackens all parts which have been protected from the action of light. It is then washed in plain water, then in very dilute sulphuric acid, and then again in water. One ounce of aniline in sixteen ounces of benzole will answer well.

M. F.—Send to Mr. York for his catalogue of lantern slides. The collection is very extensive.

Several Correspondents in our next.

The Photographic News, November 8, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Mr. Thomson's Book on Cyprus—Photographs for Wall Pictures—A Fast Cement.

Thomson's Book on Cyprus.—Mr. J. Thomson, F.R.G.S., has returned from his photographic tour in Cyprus, and promises us a book on the island almost immediately. The work will be in two volumes, and published, we believe, by Sampson Low, Son, and Marston. It is to be in two volumes, and illustrated, of course, by photographs of the country, which could hardly be represented by better hands than those of Mr. Thomson. His magnificent Chinese landscapes, many of which have been exhibited in Pall Mall, are proof sufficient that his volume on Cyprus will be worthy of attention, and we are glad to see that he intends its publication while public interest is still felt for the latest addition to Her Majesty's dominions. Mr. Thomson worked the wet process for his plates, since his tour was manifestly taken for photographic purposes, and he desired, as a matter of course, to secure the best and most trustworthy negatives possible. The difficulties in the way of moving his impedimenta about the island brought him into contact with the natives every day, and his experiences, therefore—which will no doubt be narrated in the letter-press of the volume—should be very entertaining reading. He ascended to the top of Mount Olympus, and is loud in his praise of the beauties of some parts of the island. As to sickness and ague, these no doubt prevail to some extent in certain districts, but Mr. Thomson says that the accounts which have reached this country have been much exaggerated. He himself, at any rate, did not suffer seriously from illness, and yet his duties exposed him time after time to the vicissitudes of the climate. Mr. Thomson will dedicate his book to the Lord High Commissioner of Cyprus, Sir Garnet Wolseley, and it is to be hoped that he will adopt some permanent process for printing the photographic illustrations. We do not think Mr. Woodbury's *Treasure Spots of the World* has ever been beaten as a photographic volume, both in respect to the illustrations and system of mounting adopted, for one of the main difficulties with photographs is to surround them with a simple and satisfactory border. Failing Woodburytype, carbon printing might be resorted to, but the work in this case would hardly be so satisfactory to the author and publishers, we should think.

Photographs for Wall Pictures.—For years past, photographs have been gradually elbowing engravings out of the way in libraries and drawing rooms, and it is now no rarity to see walls covered with magnificent photographs of palace or ruin, instead of the bald engravings that so often do duty as panelling. This branch of the art is one in which carbon printing has made its own, and although one still sees many silver prints of large dimensions, such firms as Braun of Dornach, the Autotype Company, and others are rapidly making a move for the better. Braun's pictures of Venice and Switzerland, many of them of very large size, are well known, and make fine wall pictures, and the same may be said of several issued by the Autotype Company. The pictures of the Thames issued by the latter firm are very suitable for library and drawing rooms, and it is to be regretted that the choice is so very restricted. It wants a very good negative to enlarge well and give a tasteful picture, for directly there is chalkiness apparent in the architecture or square inches of pure white in the high lights, all the beauty of the photograph goes. But a few weeks ago, in a walk through Derbyshire, we noticed some large photographs of Haddon Hall and Chatsworth, two subjects particularly suitable for wall pictures. But none of those we saw would have been worthy to take the place of a tolerable engraving. The negatives from which they were secured either did not bear enlargement, or the enlarging was ill done. Where is Mr. Earl, of Worcester, who produced such fine landscape photographs five years ago? Now that there would be no difficulty in securing carbon impressions, people would not mind giving a good price for their purchases. If people will give a guinea or twenty-five francs for a handsome silver picture to hang on their walls, they would not object to twice the sum for impressions which will not fade. And let it be remembered that in a dining room photographs are especially subject to vicissitudes. Not only is the sunshine permitted sometimes to pour upon the pictures daily for hours together; but in wintry weather, the fumes from the gas are no less injurious to the well-being of photographs. It must be a good silver print, therefore, that will stand the trials inflicted upon it as a wall picture; and to tell the truth, there are few which go through the ordeal untouched. Especially is this the case with the Italian pictures which English tourists bring home with them after a tour in Florence or Naples. In Italy, probably, albumenized pictures are to be purchased much more cheaply than in other parts of the Continent, and they are correspondingly unstable. Under the "Bridge of Sighs" is seen a semi-circular moat that grows more yellow every day; and the "Leaning Tower of Pisa" appears, after a while, to be in a pea-soup atmosphere. But then only three or five francs, it will be found, has been paid for a two-foot picture, and instead of being surprised at the poorness of the picture, one begins to wonder how it could have been produced at all at that rate. Unfortunately such prints do photographers in general a vast amount of harm, since the owner of a perished picture is not likely to buy another photograph in a hurry. He loses his faith in camera pictures, and henceforth will have nothing to say to them. With permanent printing at our fingers' ends, we may now hope for better things, and we feel sure that if a collection of broad pictures were produced of scenes in Britain and Ireland, and properly placed before the public, these would not fail to find ready purchasers among the upper and middle classes for the adornment of dining-room and library.

A Fast Cement.—A very valuable cement has been discovered by Mr. A. C. Fox, of which details are published in *Dingler's Polytechnisches Journal.* It consists of a chromium preparation and isinglass, and forms a solid cement which is not only insoluble in hot and cold water, but even in steam, while neither acids nor alkalies have any action upon it. The chromium preparation and the isinglass or gelatine do not come into contact until the moment the cement is desired, and when applied to adhesive envelopes, for which the author holds it to be especially adapted, the one material is put on the envelope covered by the flap (and therefore not touched by the tongue), while the isinglass, dissolved in acetic acid, is applied under the flap. The chromium preparation is made by dissolving crystallised chromic acid in water. You take:—

Crystallised chromic acid ...	2·5	grammes
Water	15	„
Ammonia	15	„

To this solution about ten drops of sulphuric acid are added, and finally thirty grammes of sulphate of ammonia, and four grammes of fine white paper. In the case of envelopes, this is applied to that portion lying under the flap, while a solution prepared by dissolving isinglass in dilute acetic acid (one part acid to seven parts water) is applied to the flap of the envelope. The latter is moistened, and then is pressed down upon the chromic preparation, when the two unite, forming, as we have said, a firm and insoluble cement. In the case of mounting carte-de-visite or other photographs, it would perhaps be wisest to apply the chromic preparation uniformly to the mounts first of all, and permit these to dry, when they would be ready for use at any moment. The print would then merely have to be faced with the solution of isinglass and acetic acid, and pressed to the mount. We have ourselves no practical experience of the cement, but it would be well worthy of trial by photographers.

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

HAVING in the preceding division of his subject dealt with the behaviour of plain gelatine with various reagents, the author proceeds in the next chapter to describe that of chromatised and exposed gelatine under similar circumstances. While it is true that all substances which render insoluble pure gelatine produce the same effect on chromatised gelatine, there are many bodies which can make chromatised gelatine insoluble, but have no action with plain gelatine; such are all those bodies that have the power of reducing the chromium acids to chromium oxide, where, however, it is in the first instance not the reducing body itself, but the resulting chromium oxide, that produces this effect. It is in the first place important to observe that there is a material relation between the length and intensity of the exposure and the induced solubility of the chromated gelatine; the longer the duration of, and the more intense the exposure, the higher must be the temperature of the water to dissolve the colloid. On this fact depend many of the artifices and devices of photographers to produce good carbon prints and collotype plates.

In the carbon process the gelatine that has become insoluble by the action of light still possesses a power of absorbing fluids. A carbon picture treated successively with two solutions that react on each other to produce a colouring material, will assume a decidedly different colour; in this way, such a picture may be coloured dark violet, by successive treatment with an iron salt and gallic acid, or yellow, by means of potassium chromate and lead. According to most authorities, carbon prints must be developed with water not hotter than from 40° to 50° C.; while some recommend even a lower temperature, because of the risk of destroying those parts that have been faintly acted on during exposure. But if, in consequence of being too long exposed, the gelatine should have become too hard, and the picture therefore fogged, water heated to from 50° to 60° C. may be used, and will serve to clean it. The same result obtains in photo-electrotyping; or very hot water (about 65° C.) a less delicate picture than a tepid one. Both acids and alkalies act on chromo-gelatine that has been exposed more or less as solvents. If such a gelatine be washed with hot water until the latter runs off colourless, and be then treated with cold dilute hydrochloric, nitric, or sulphuric acid, the yellow chromic acid will be dissolved out of the film, and the latter will lose its brown colour; very little chromium oxide will be extracted. The remaining mass digested in dilute hydrochloric acid dissolves with difficulty, and the solution contains gelatine and chromium oxide. Hot diluted acids act slowly as solvents; the chromic acid is first dissolved, and then the gelatine. But when the film is a thick one, all the chromic acid cannot be removed in this way. Acetic acid acts in the same manner as, but much more slowly than, the mineral acids.

Ammonia rapidly dissolves out the chromic acid, particularly when the film is warmed, so that in a short time the whole of that substance will be formed in the solution without any large admixture of gelatine. The remainder is of a green colour, and is rich in chromium oxide. A thin film is more quickly dissolved by a solution of ammonia than by pure water, and on this account the addition of ammonia to the developing water has been recommended for clearing collotype plates, in preference to water at a high temperature.

Sodium and potassium carbonate also remove chromium acid from the exposed chromated film, but acts more energetically than ammonia on the gelatine as rapid solvents. For this reason a solution of sodium carbonate is an excellent means for clearing over-exposed and fogged carbon pictures, and is preferred for this purpose by the author to all other reagents.

Caustic soda or potash acts in the same way as the carbonates in solvents, and in removing the chromic acid, but they attack the gelatine much more powerfully. A concentrated solution of soda dissolves the exposed film with excessive rapidity, and can be used with advantage for cleaning off old collotype plates. In clearing carbon pictures with a solution of the alkali, great care must be taken to make it only one-tenth as strong as one of the carbonate, or the weakening will become too rapid, and may be carried too far.

Borax, owing to its alkaline reaction, has a solvent effect, but one not so strong even as that of ammonia.

Sodium chloride in solution also dissolves the film more actively than pure water, and on this account is used to clear over-exposed carbon pictures; but its action is weaker than that of soda.

Potassium cyanide acts upon the exposed chromo-gelatine quicker than sodium carbonate, and can therefore also be used for clearing carbon prints and collotype plates, but it often removes more of the image than is desirable. According to the author, it is more advisable to pretermit the use of the salt altogether, and that on *a priori* grounds, because of its poisonous properties.

In any case, care must be taken that an alkaline developing fluid is not too concentrated, or it will produce creases in the gelatine, and cause it to be grained. A favourite method is to develop with water weakly acidulated; by that means not only will the greater part of the chromium acid be drawn out, but the solubility of the film in hot water will be promoted. When the development of a carbon print or of a photo-electrotype plate is not properly effected with hot water, it will be advisable to add about one per cent. of sulphuric or hydrochloric acid, which will be found to produce the required effect with ease and delicacy. Some experimenters have expressed a fear that carbon prints developed by the aid of hydrochloric acid may be liable after a time to turn yellow; but the author's experiences led him to believe that this does not occur even after a considerable time has elapsed. Hydrochloric and sulphuric acids are to be preferred to nitric acid, because they attack the gelatine less, and preserve the details better. Dilute nitric acid (1 : 6) brushed over a collotype plate lowers the relief, and promotes the appearance of the most delicate tones.

Quite fresh chlorine water has scarcely any clearing effect; when it is older and has formed hydrochloric acid it is more powerful. Calcium chloride gradually dissolves the film, and has been recommended for clearing; but more recently sodium carbonate is preferred, as acting more slowly.

The organic act more gently than the inorganic acids, and can be used with effect in the less obstinate cases. Citric and oxalic acids can both be advantageously used for clearing photo-lithographic paper and collotype plates acetic acid acts too weakly.

Some substances increase the power of collotype plates to take up the ink, others decrease it. The alkaline bichromates and alum, and the salts of the metals, especially the soluble chlorides, act in the former way; whereas potash, borax, and potassium cyanide tend to clear—when highly concentrated, to dissolve—the plates; so also ammonia and tartaric, citric, oxalic, phosphoric, and carbolic acids. Dilute hydrochloric, sulphuric, and nitric acids promote the facility with which the exposed parts will take up ink. Acetate and hyposulphite of sodium, and the chlorides of calcium, zinc, and sodium, keep the plates moist after printing, without making them sticky, or letting them decompose. Oxalic acid alone of all these reagents produces a grain in the film. Collotype plates dipped in a six per cent. solution of zinc chloride become harder, and are able to withstand a greater number of printings; at the same time they show the lights clear and white.

(To be continued.)

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WORKING HINTS FROM PRACTICAL MEN.*

Copper in the Developer.—Another correspondent thinks the value of copper in the developer is not commonly fully appreciated. He says:—"There is one thing which, though old, yet is practised by so few that it seems well to again call attention to it, viz., the use of 'copper sulphate' in the developer. Edward's formula for the use of this salt is probably the most generally known, but even that is little used. The majority of operators seem to delight in making a saturated solution of either 'plain iron,' so-called, or 'iron and ammonia,' letting it stand, and gather its scum of oxidization on the surface, allowing it to adhere to the jar or bottle containing it, both inwardly and outwardly, till it is, or should be, a plague spot in the dark room. This, diluted by guess-work, often forms the staple developer to be used on any 'victim' that 'happens in.' Now aside from the disadvantage of dirt, uncertainty as to its condition, strength, &c., there cannot be so good results obtained in the matter of delicacy of development and cleanliness of action as the 'copper developer' exhibits. Six ounces of 'plain iron,' one to one and a-half ounces of copper sulphate previously ground fine (unless you use a dissolving jar), with eighty ounces of water, after standing for an hour or two, and then being filtered, will give you a developer of minimum strength, which, in my practice, has given the best of results, though in some way contrary to preconceived ideas on the use of copper. I am obliged often to make such things as glassware on the same plate with articles of as dead white surface as Parian marble, and only by use of above developer can I do it successfully. Two such opposite characteristics as presented by the opacity of the whites, and the delicate half-lights necessary to bring out the full shape of the glass, are seldom required on the same negative; and if it stand such a test, how much more likely to in the lesser contrasts of portraiture. Besides the above, and as important in the dark-room as a good negative, is, in the printing-room, the cleanliness of this developer, and its good keeping qualities ought to recommend it more to use. It takes less acid, owing to the copper itself being in measure a restrainer, and by only adding acid (say one ounce) to a pound at a time, or just as you wish to use it, there is no trouble in keeping a stock solution clear and clean for mouths."

Developer, Collodion, &c.—Mr. E. K. Hough supplies several hints for the operating room. He says:—"My formula is none of it entirely new and original, but my mode of working differs somewhat from the regular routine, and mostly in the direction of ease and convenience. Being naturally of a labour-saving disposition, I have never considered it an aggravation of original sin to avoid as much as possible the old penalty, 'in the sweat of thy brow,' &c. To begin with developer.

"I keep a saturated solution of iron in a wide-mouthed well-stoppered bottle, constantly saturated; having an excess of iron, a drop of sulphuric acid or a little sulphate of copper keeps it from oxidizing, and it settles clear. By carefully decanting into a graduate the quantity desired, and filling it with clear water to the required dilution, and adding the acid and alcohol required, it is ready for immediate use. It can be made in smaller quantitities, because it can be so easily replenished. I use a hydrometer to test its strength, which, of course, I make to vary with the temperature. I now use it at fifteen degrees. I also use iron to redevelop before fixing when required; a weak solution, not more than five degrees, with a few drops of silver. Collodion I prepare on the same principle. I do not weigh anything; I use two wide-mouthed glass-stoppered gallon bottles, for plain or normal collodion; one settling while using from the other. I buy cotton by the ounce, and calculate how many ounces of ether and alcohol are needed for the quantity. I put all the ether in the bottle, add the cotton, shake till thoroughly wet through, then add about one-quarter or one-half of the alcohol, and shake till entirely dissolved, which is rapidly accomplished, then add the balance of alcohol, shake well, and leave two weeks or a month to settle while using up the other bottle. When desired to sensitize, I decant and add from a sensitizing solution previously prepared and settled, so that no filtering or settling is necessary, and by using the 'Scovill Pouring-bottles,' of which I have over a dozen in use, and which are marked off in ounces with sufficient accuracy for all practical purposes, I can sensitize my collodion directly in the bottle, and use in five minutes after with entirely satisfactory results, but I do not prefer that extremely short cut; I generally sensitize about three to five pounds at a time, and leave to settle, and again decant carefully into the pouring-bottles for use. Sensitizing solution I make by adding—

Iodide of ammonium	2 ounces
Iodide of cadmium	1 ounce
Bromide of cadmium	1 ,,
Alcohol	17 ounces

making about one hundred grains to each ounce of solution, allowing four hundred and thirty-seven grains to the ounce. I also use lately rubber corks for my pouring-bottles which makes them complete. I say rubber corks as the old deacon wanted the church ceiling white-washed blue. The proper name would be 'stopples,' I suppose; but by whatever name they are a great improvement, and should be kept in stock by every photographic dealer, and used by every photographer. They are firm, tough, elastic, and close a bottle hermetically, as you might say; so there is no popping out of corks in hot weather, and no annoying bits dropping in after you have screwed them down tight, and wrung their blessed necks off getting them out again —the corks, not the stopples—you can't wring them off; they can stand it as long as you can. Try them."

Sensitive Paper.—Mr. Julius Hall gives a hint on sensitive paper. He says:—"We silver and fume the paper the night before it is to be used. In warm weather the evening air is cooler, and favours the keeping of the paper, and I find it much more comfortable working with plenty of fresh air than being boxed up with a gas or kerosene light. Then, again, you are very certain no white light reaches the paper until it comes through the negative and I am fully convinced that daylight small it may be in quantity, is one great cause of yellow paper; and I too find that paper prints much nicer several hours after fuming than just after. Second, instead of putting prints into acid water direct, put them into a bath of plain water first. They will redden much more evenly, and are easier to handle."

Producing Negatives.—Mr. Frank Jewell gives full synopses of his mode of working. "I send you herewith my formulæ.

Collodion.

Alcohol and ether	equal parts
Iodide of ammonium	4½ grs. to the oz.
Bromide of cadmium	2 ,, ,,
Gun-cotton	5 ,, ,,

Silver bath from 30° to 40°, slightly acid.

Developer.

Iron	1 ounce
Water	16 ounces
Acetic acid	enough to flow smooth

Seldom redevelop, but when I do, use

No. 1.

Pyrogallic acid	12 grains
Water	12 ounces
Citric acid	12 grains

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* Continued from page 461.

No. 2.

Silver bath solution	1 ounce
Water	1 ,,

Flow the plate with No. 1, and pour into small bottle or developing cup; add two or three drops of No. 2, and flow off and on the negative until sufficient density is obtained.

Negative Varnish.

Alcohol	16 ounces
Gum sandarac	2 ,,
Gum turpentine (Venice turpentine)	1 ounce

"This varnish is good to retouch on without grinding, but in bad cases I grind the face part only, by rubbing briskly with the ball of the finger tightly drawn. It gives a surface much finer than pumice-stone.

"For retouching, I use Faber's leads (graphite), in the patent holders, HHHH and HHH.

Printing Bath.

Silver	60 grains
Water	1 ounce
Nitrate of ammonia	30 grains

Made slightly alkaline.

"*Toning Bath.*—Gold in a quantity of water sufficient to tone in about ten minutes; make slightly alkaline with a solution of sal soda, and add from one-quarter to one-half ounce table salt. Let stand about a half hour.

"I have a little dodge in printing which, while it is not new or original, is not generally practised by photographers, but which, should it be adopted, would, I believe, give general satisfaction. I had a great deal of trouble to get my printer to trim his prints so that they would look right on the card; some would be on one side, others too high or too low, some not straight, &c. It was too much trouble for me to cut them out myself, so I adopt the plan of trimming my paper before I print. A half sheet is folded so as to make sixteen cards, and the bad edges are allowed to lap over sufficiently to be entirely cut off in trimming. After the paper is folded the glass form is laid on, and the paper is cut with a pair of sharp scissors. The negative retoucher has a glass the same size as the printer's, and he lays out the negative with this glass, and pastes little strips of gummed paper, one on top, two on the right-hand side, one near the top, and one near the bottom. The printer now has a guide to put his paper on the negative, and every print comes on the paper just alike. It was long before I could make up my mind to try this plan, for fear there would be much trouble in getting the paper on the negative, but I find the trouble less; and the satisfaction of knowing that your prints are all trimmed after you are through printing, and that they are all alike on the paper, is great."

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SAVING AND REDUCING WASTE.

In response to several correspondents, we collect from various sources several practical processes for recovering silver and gold from waste solutions.

By Means of Zinc.—Mr. H. L. Bingham, in an American contemporary, gives a method which he describes as simple and economical. He says:—"I burn my paper wastes to a fine ash; then digest with nitric acid, with a slight portion of water. After the silver has well dissolved (which will require several hours, with occasional stirring with a glass rod), then add sufficient water, and let settle well; then decant or draw off with a syphon into a large bottle with a quite strong solution of salt water. To convert into chloride of silver, add more water to the silver, and decant again as before, repeating as often as necessary to wash out all soluble silver, each time using caution to see that all the silver is converted into chloride. The chloride can be allowed to settle, and the water decanted, and by repeating the salt and water with silver, a large quantity of chloride can be precipitated in one bottle. It is well to repeat the nitric acid on the residue of the ash, to be sure to get all the silver dissolved; after getting all your silver wastes converted into chloride, and well washed through several waters to free it from fine salt, then put the mass into a large porcelain evaporating dish, and drain; after well settling all the water off possible, then cut up strips of zinc, and set up edgewise, and let stand for a day or two, to convert the chloride into metallic silver; there should be pieces of zinc about every half-inch apart throughout the chloride; after the chloride has been well converted into metallic silver, take out what zinc remains, then digest with sulphuric acid to dissolve the zinc, which can easily be told by adding a small quantity of acid after effervescing has ceased; and should there be no more indication of zinc, you can be sure all is dissolved. Now wash the remaining precipitate well with soft water (a dozen or fifteen waters will be none too much) to thoroughly get rid of the zinc; all that remains is to dissolve the silver with nitric acid, and draw off into or filter into a bottle, then add more water, and decant, &c., until you wash out all the silver. I usually add more nitric acid after well washing, to be sure and dissolve all the metallic silver, and treat as before, &c. I wish to say here, the first treatment of the chloride with zinc may not convert the whole into metallic silver, and just so in each treatment. Repeat the operation until you accomplish the purpose intended. Then evaporate the acid and water from the silver you have in solution, and fuse; then add water, and leave in solution, and set in the sun. The process is much more simple than I have been able to describe it, and the result is the purest silver I have ever used, and the expense is trifling. A short time since I reduced my wastes, and got nearly two pounds of silver at the expense of about three dollars. I believe this is the manner the United States Mint treats what, I believe, they call slag, to procure absolutely, or as near as possible, pure silver. Of one thing I am certain—I never used any purer than what I have made with this process."

By means of Heat.—A correspondent of *Anthony's Bulletin* gives a method of reducing residues in the crucible, of which he speaks very highly, as having been given to him by a practical refiner. All kinds of waste are dried, and treated as follows:—"Say you have one pound of silver waste; take one pound of pearlash, two pounds of common salt, mix them well together by sifting through a sieve, or otherwise; place the whole in a crucible of clay, not black-lead or plumbago. Now see to the stove. Place on the middle of the grate half a brick, or, still better, the bottom of an old crucible, bottom upward, as a table to stand your crucible on; make up a little fire round this, then put in your crucible, surrounding it with fuel; place a cover or large lump of coke on top; get your heat up, and when all is apparently in a liquid state in the crucible, add more of the waste, if there be any, as a crucible first filled will bear to be refilled two or three times; give more time in the fire, stir it with an iron rod, or, if the fuel has dropped into the pot, dip it out with an iron ladle. All the silver ought to sink to the bottom of the crucible in the shape of a button, large or small, as the case may be. Now see all safe, and go to bed, or let the whole remain till the fire is out; but if you feel as I did when I began, and want to know the result, get a pair of smith's tongs, and remove the crucible from the fire, not on to the hearth, say, but into a pail of water, and the result will be, the whole household will have a vapour bath gratis. When cold, break off the bottom from pot, and there is the precious metal in one solid button, if properly fused. The tools required are a few clay crucibles, a pair of smith's tongs, a small iron ladle one-and-a-half inches, with a hole in the bottom for the metal to drain through. Sometimes the crucible will break in the fire; save everything, ashes and all, and wash by shaking in a pan of water. The metal will be found at the bottom, to be remelted. As a precaution against accidents, some fire-clay, mixed with cow-dung, is made into a stiff dough, a lump put on a piece of strong paper, the filled crucible pressed into the dough, and the paper, &c., brought up round the sides to about one-third its height; this forms a second crucible on the lower part and is a great protection to the first one. Another plan is to place the crucible mouth downwards on a moderate fire before filling. Metallic gold or silver can be melted without flux, and a plumbago pot used, which will do for many times; but with a clay crucible and flux you require a new one each time. I use ordinary gas coke, but think anthracite coal would be just as good. In getting up your heat, cover the pot some inches deep in fuel. Don't be afraid if a little gets in, as it will swim, and can be easily taken out with the small ladle. The metal will run out through the small hole in the bottom of the ladle, should you skim any with the dirt.

Reduction of Nitrate of Silver by Means of Charcoal.—A very simple method of reducing nitrate of silver, analogous to that some years ago mentioned by the late Mr. Hadow, is given in the *Archiv der Pharmacie*, by Mr. C. F. Chandler. If crystallized or fused nitrate of silver be placed upon glowing charcoal, combustion forthwith takes place, the silver remaining behind in a metallic form, while nitrous oxide and carbonic acid are freely given off. The nitrate of silver is fused by the heat developed by the reaction, and is imbibed through the pores of the charcoal; as every atom of consumed carbon is replaced by an atom of metallic silver, the original form and structure of the charcoal are preserved intact in pure silver. By proceeding in this manner it is possible to produce silver structures of any desired size, possessing in every way the original form of the wood. A crystal of nitrate of silver is in the first place put upon a piece of charcoal, and a blow-pipe flame is then applied in the vicinity, in order to start the reaction in the first instance, and as soon as combustion commences crystal after crystal may be added as these, one after another, become consumed. The silver salt is liquefied, and penetrates into the charcoal, where it becomes reduced. Pieces of silver may in this way be prepared, of one or two ounces in weight, which exhibit all the markings and rings of the original wood to a most perfect and beautiful degree."

Reducing Silver from Old Baths by means of Oxalate of Soda.—The *Archiv* gives the following:—"The silver solution should be nearly neutral. The oxalic acid dissolved in distilled water, and carbonate of soda is added until the mixture retains only a slightly acid reaction. Great excess of acid causes loss of silver; an excess of carbonate of soda may make the metal impure. When the slightly acid solution (of oxalate of soda) has been filtered, it is added to the silver bath until all the silver has been precipitated in the form of the white oxalate of the oxide of silver. The precipitate is collected, washed, and dried; it is mixed with its own weight of bicarbonate of soda (this is best done in a mortar). The mixture is placed in a porcelain or earthen vessel, and heated on a common stove until the whole compound has assumed a grey colour; a moderate heat will be sufficient for this purpose, but it is advisable to let the vessel remain for half-an-hour on the fire, in order to be certain that decomposition has taken place. The residue is poured in warm water, and, after stirring it well, is left to stand for some time. The silver will precipitate as a brownish-white powder. The supernatant water, with carbonate of soda, is poured off; in order to remove the last traces of this substance, the silver powder is mixed with diluted acetic acid, and well shaken; after being washed once more with water it is dissolved in nitric acid."

By means of Grape Sugar.—Professor Joy says:—"Chloride of silver can be reduced by grape sugar, and this method affords a way for reclaiming photographic wastes, and of preparing pure metallic silver. Take fourteen parts of well-washed and still moist chloride of silver, twenty-four parts of caustic soda, sp. gr. 1·333, 11¼ parts ammonia, sp. gr. 0·925; to this add, with constant agitating in a flask, 7½ parts pure honey, or 9½ parts grape sugar syrup, and let the mixture stand in a warm place, until sulphuretted hydrogen affords no sign of silver. Decant, and wash out all traces of chlorine. The reduced silver can then be dried, and melted in a crucible. Platinum black, finely divided metallic platinum, can be obtained from the chloride by adding carbonate of soda in excess, and, after adding grape sugar, heating the solution for ten minutes. The precipitate can be collected in a filter, and then well washed and dried.

By means of Zinc.—In the *Polytechnic Journal* Dr. Grager gives a detailed description of the reduction of chloride of silver dissolved in ammonia by means of metallic zinc, which process, according to the author, succeeds very well, and yields a silver of greater purity than is obtained by the process for reduction of silver by the moist way now in use, provided the operation be carried on in closed wide-mouthed stoppered bottles. The silver, after complete reduction (and this has to be tested for by means of a drop of the ammoniacal fluid being put into some hydrochloric acid), is first thoroughly washed with concentrated hydrochloric acid, next in water, and, lastly, for some moments with dilute ammonia, and then again with distilled water, and provided the zinc be used in large lumps thick enough to admit of being readily removed from the spongy silver. It is clear that this method of reduction involves the use of a considerable quantity.

Use of Pyrogallic Acid in Recovering Gold Solutions.—Mr. William Bell says:—"Many photographers do not recover their gold from their waste solutions themselves, deeming it troublesome. Now no operation in photography is more simple, or less conducive of trouble, and the slight trouble so well repaid. My mode is to collect the used gold solution into a gallon bottle, and, when nearly full, neutralize the alcohol in it by hydrochloric acid, making it just acid (no more); then taking two ounces of pyrogallic acid solution to twenty grains strong; pouring this into the neutralized waste gold solution, shaking well; let it stand for twenty-four hours, to allow the precipitated gold to settle; then pouring off (into waste barrel) the upper solution, being careful not to lose any of the precipitate, which catch on a filter; wash two or three times in water. Now place precipitate and filter into an evaporator, and dissolve with nitro-muriatic acid (one ounce nitric to four ounces muriatic): this I keep already mixed, using only so much at a time as is necessary to dissolve the gold; evaporate over a water or sand bath, and there is no danger of overheating in evaporating. The gold solution produced by precipitating with pyro will be found to be of the best toning properties—even better than that precipitated by iron, as there is always more or less danger of iron being present."

Hydrate of Chloral as a Reducing Agent.—It is alleged that chloral hydrate has been found valuable as a reducing agent, the noble metals being easily reduced by it in the presence of caustic potash or soda. When the solutions of gold, or of the metals of the platinum group, are treated with hydrate of chlorol, warmed, and an excess of caustic soda added, and the whole boiled for a minute, a complete reduction of the metals takes place, probably in consequence of the liberation of some formic acid by the splitting up of the chloroform. In the case of silver salts the reduction is also complete, and chloride of silver is formed. Mercury salts are not acted upon. These properties of the hydrate of chloral suggest its possible application for metal plating on glass, and it may be found useful in recovering the metals from photographic waste, if no higher photographic use be found for it.

The Photographic News.

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THE PHOTOGRAPHIC EXHIBITION.

V.

Amongst the specially interesting portraiture at the Exhibition is a frame exhibited by Messrs. Alder and Clarke (295). The special feature of interest is found in the fact that the negatives are produced by artificial light, although nothing in their appearance suggests that they are not good work produced in an ordinary studio. They are well lighted, and possess excellent gradation and modelling, and there is an entire absence of the constrained expression usually associated with the use of an intense artificial light, which has a tendency to distress the sitter. The light, we understand, is produced by the combustion of a pyrotechnic composition in a lamp of special construction, which is patented. That the possibility of producing portraits by artificial light is often of great value does not need enforcing, and it is well known that the method of applying the electric light to such a purpose as devised by Mr. Vander Weyde is very costly, and not available to photographers generally; hence a simpler method, accessible to all, is a matter of considerable interest and importance.

Three contributions sent by Mr. Guttenberg (144, 145, and 146) are also very interesting. They are styled "photographic drawings," presumably because, although strictly the work of the camera, they closely resemble hand drawings in many respects. They are produced by a method, which has been patented, of double printing; pictorial backgrounds and artistic stippling on the figures being produced by printing through prepared screens. The effect in the examples shown is very pleasing.

Another speciality in portraiture worthy of attention, forming no part of the Exhibition proper, will be found hung on the wall of the staircase leading to the gallery. Coloured work has been of late years excluded from the Exhibition, as having no legitimate claim to a position amongst photographs. The special qualities of these pictures, and the fact that the true character of their photographic origin is not hidden by being painted upon, made it desirable, however, that photographers and the public interested in photography should have an opportunity of seeing them. They are contributed by M. Lombardi, and are entitled "Poikilographs." The special character is produced by painting at the back a photograph which is made transparent. This plan has been often adopted before. The special characteristic of the specimens to which we refer is their exceeding excellence. Whether this is due to the unusual skill of the painter, or to some peculiarity in the process or materials employed, we are not in a position to state. A copy of Ruben's "Judgment of Paris" is a singularly fine work, possessing all the well-known peculiar richness and brilliancy of colouring of the great master, with a truth in the drawing scarcely, by any possibility, to be attained by hand-copying.

The loan collection contributed by Mr. Warnerke is, by common consent, regarded as one of the chief elements of interest in the Exhibition, and specially worthy of attention. Amongst these are some fine examples of portraiture. Photographers will remember the great interest excited by some Russian pictures contributed to the Edinburgh exhibition a year or two ago, which received a medal; these were sent by M. Karelin. A number of single figures and groups by the same artist are to be found on one of the screens here (No. 20). They are distinguished by two characteristics: first, that the majority of them are taken in direct sunshine, and are free alike from chalky lights and black hard shadows, common in such work. These are delicate and luminous to a high degree. Few photographers have attempted such work with figures, and still fewer have attained a degree of success approaching that of M. Karelin. Amongst English photographers, Mr. H. P. Robinson has often attempted this class of work, and with rare success and fine effect. M. Karelin's pictures have another quality equally rare: we refer to the unusually perfect diffusion of definition. Here is a group, on a plate something like eight by six, with five figures sitting round a table in a room, which, with all the interior accessories, is well-defined, and two figures seen outside the window, also well-defined. M. Karelin is supposed to possess a secret method of effecting this work; but whether it consists in unusual optical appliances, or in a skilful method of using more than one negative, we cannot say; but the pictures are well worthy of the special attention of photographers. A few years ago some excitement was caused by the reports of rare excellence in portraits produced by M. Denier, a photographer at St. Petersburg. The portraits possessed an unusually soft delicacy of definition and perfection of modelling, without cutting hardness or sharpness. The secret was afterwards offered by circular letter to photographers for a consideration. We were enabled shortly afterwards to explain the method of production to our readers. It consisted in the use of two nearly identical negatives—produced, in fact, simultaneously at the same sitting. The only difference in the character of the two negatives consisted in the fact that one was exceedingly soft and full of gradation, and the other vigorous and full of contrast. These being superposed, the picture was produced at one printing. The result of such simultaneous printing from a combination of negatives is the printing of a sharp image and a soft image, one slightly blurred by the absence of direct contact, the picture possessing a charming softness and fine modelling. We gave details at the time of two or three methods of producing the identical negatives for use in such simultaneous printing. The examples lent by Mr. Warnerke (26), are *cartes-de-visite*: the method is not so effective for small figures as for large heads; but these are very fine. A number of groups and single figures illustrating peasant and other forms of national life in Russia, by Mr. W. Carrick, a Scotchman naturalized in Russia, are also found amongst the loan collection sent by Mr. Warnerke, and will well repay careful examination; as will also the groups by M. Lewitsky. Some other good groups and figures are amongst this collection.

Amongst the English portraiture we omitted to notice in our last, are some fine examples by Messrs. Boning and Small. No. 313, a portrait of Miss Violet Cameron, is exceedingly good, the most effective portrait we have seen, indeed, of this often photographed and charming model. Mr. S. Symonds, of Portsmouth, also sends some more than usually good examples of portraiture. Some very good specimens of child portraiture are sent by Mr. W. Allan Richardson.

One of the most effective frames in the gallery, probably—indeed, *the* most effective frame—comprises a series of portrait studies by Mr. Augustus W. Wilson, an unassuming but highly skilful portraitist in the remote suburb of Kingsland. Mr. Wilson's subject is, however, an ambitious one: he has attempted to illustrate by photographs from living models the Seven Ages of Man, described by Shakespeare in *As You Like It*—no light task if the selection of suitable models alone be considered. The Mewling and Purking Infant, the Whining School-boy creeping like snail unwillingly to school, the Sighing Lover, the Rough and Ambitious Soldier, the Formal Justice, the Lean and Slippered Pantaloon, and Decrepit Age. The mechanical difficulties are, however, small, compared to those of an artistic and poetical character. Both in material and treatment Mr. Wilson has, however, attained a high degree of success. The pictorial treatment, and the suggestiveness of character, are worthy of high praise. It might be easy to point to some shortcomings in matters of detail; but the task would be ungrateful where a high aim is so well realized.

We may here repair an omission in our notices of the results of dry plate work. Two fine views produced on gelatine emulsion plates by Mr. J. D. Radcliffe, from their somewhat inaccessible position, escaped our attention. They, as well as all the pictures so produced, which we have already noticed, rank very high in excellence. They possess good artistic qualities, and are perfect technically.

GELATINO-BROMIDE.

BY ERNEST BOIVIN.[*]

The difficulty of being always able to obtain the Kennett pellicle, which is only procurable in London, prevents the general employment of the gelatino-bromide process, though this process offers an excellent means for getting good negatives. People are frightened at the long and tedious operation required for preparing the sensitized gelatine; but if they could procure this substance ready-made, as is the case with other photographic products, many other persons would adopt the process, and all could appreciate it at its true value.

Gelatino-bromide is very easy to use and convenient to manipulate; it does not easily spoil, and has only to be shielded from light and moisture. The sensitive plates are easily prepared, and can be kept for any length of time: a little gelatino bromide dissolved in hot water, and flowed over the plate, constitutes the whole operation—nothing can possibly be more simple. When the subject is well illuminated, the exposure may be instantaneous, and need never exceed a few seconds. There is no necessity for coating the plate with a substratum, nor the sensitive film with a preservative. The image can be developed rapidly and completely, even when some time has elapsed since the exposure. In short, the gelatino-bromide process is one of great simplicity, easy to manage, affording great sensitiveness in the dry state—all at a very trifling first-cost. These are certainly very valuable properties: the only wonder is that this process has not supplanted that with wet collodion; but, on reflection, it will be evident that photographers are not likely to abandon from one day to another a process that has rendered good service, with which experience has rendered them familiar, and to replace it by one upon which they have had neither time nor opportunity for forming an opinion. Besides which, though the gelatino-bromide posessses incontestable advantages, it has also its inconveniences; it is, for instance, necessary to observe with the greatest care to even the minutest details of the manipulations. No doubt in this, as in every other process, some practice is necessary before successful results can be obtained; but when once the different steps have become familiar, no difficulty will be experienced. A few trials will prove the truth of all that I have said in praise of this method, and will convince the most incredulous that in gelatino-bromide rests the future of dry-plate photography. Some days ago I worked with some plates prepared last summer by M. Durand, and I could detect no loss of sensitiveness; an exposure of a few seconds gave me magnificent negatives.

The essential condition of a good and highly-sensitive gelatino-bromide consists in the intimate incorporation with the gelatine of pure silver-bromide in a state of extreme sub-divison. Very excellent instructions (accessible to everyone) for preparing it have been published by M. Odagir in 1877, and by M. Liesegang and M. Fabre in this year. I shall, therefore, pass over any lengthy details of the necessary operations, and describe briefly a formula which has been in my own hands eminently successful. The method that I adopt is as follows:—

Gelatine...	5	grammes
Ammonium bromide	2·5	„
Silver nitrate	4	„
Water	100	c. c.

The gelatine is put to soak for several hours in water which is repeatedly renewed, and, when drained, it is placed in a flask graduated from 50 to 100 c.c. Enough water is added to make the whole attain a volume of 50 c.c., and then the ammonium bromide is dissolved in it. For an hour, or somewhat less, the mixture is heated over a water bath, in order to incorporate the bromide thoroughly with the gelatine, and to prevent later on the former substance from precipitating in a flocculent condition, which it is essential to avoid. The silver nitrate is then dissolved in another 50 c.c. of water, and added gradually to the bromized gelatine with continuous agitation. It is advisable—almost indispensable—to add to the mixture a few drops of carbolic acid, in order to make it keep; this is more particularly necessary in hot weather.

From the moment of sensitizing, all the manipulations must be carried out by the non-actinic light of the laboratory, on account of the gelatino-bromide being highly sensitive. The emulsion must now be allowed to ripen for a few hours; when the flame of a candle viewed through a drop of the gelatine that has been allowed to fall and spread on a piece of glass appears of an orange red colour, it is a sign that the emulsion is ready for use. The silver nitrate is then neutralized by the addition of a few cubic centimeters of a five per cent. solution of ammonium chloride; the emulsion is well shaken, allowed to rest for a few moments, and poured into a porcelain dish, and left to set. When solid it is cut into strips with a glass spatula, and put into a cloth bag, where it is repeatedly washed to get rid of the soluble salts that still remain, and which are liable to spoil the emulsion. Generally, I effect this washing by tying the bag to the mouth of a large jar, which I re-fill several times with water. If it be desired to preserve the emulsion in a dry state, it must be drained, and afterwards washed in alcohol; it is then re-dissolved, and poured on glass plates kept in a perfectly horizontal position, where it is allowed to dry; it is thus obtained in the form of pellicle. In this condition it does not decompose; for use it must be dissolved in ten times its weight of a liquid, consisting of equal parts of beer and water. On the other hand, when it is required for immediate use, its volume must be increased in the graduated flask to one of 100 c.c., by adding the same mixture of beer and water. It will no doubt be seen that the preparation of gelatino-bromide is, if not difficult, at least very long and tedious; on this account it is always better to employ Kennett's pellicle—that is, when it can easily be procured.

The advantages of the gelatino-bromide process are very numerous; for instance, cleaning the glass plates, which in other processes is so delicate and difficult an operation, is in this method one of great simplicity. It is quite sufficient to rub over the plates with a linen cloth dipped in chalk or tripoli powder moistened with a small quantity of weak ammonia water, and then with some talc mixed with a little alum, this will render a plate quite clean enough for this process. The alum has the effect of causing a more complete adherence of the gelatine to the glass.

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[*] *Moniteur de la Photographie.*

When the emulsion has been prepared and filtered, a sufficient quantity must be flowed over the plate, which should previously have been lightly warmed; its spreading over the plate can be facilitated by the use of a glass rod or spatula. It must then be drained in order not to have too much gelatine on the plate, which would cause it to be too long in drying; but care must be taken not to carry this draining too far, for fear of obtaining slight and weak negatives. The two dangers necessary to be avoided are the formation of bubbles in the film, or in the emulsion, and an excessive draining of the plate. As soon as the plate is coated with the sensitive emulsion, it is placed on the accurately level stages of the drying-oven to be dried.

The drying is the only part of the process which requires any amount of nicety. It should combine these two conditions:—(1). It must be rather rapid, otherwise small air-bubbles and ridges will be formed in the film; (2) the plates must be placed absolutely level in the drying-oven, or the film will present different thicknesses, which would cause it to become spotty and marbled.

It is always a bad plan to prepare the plates during rainy or damp weather, which hinders them from drying quickly; dry weather should, if possible, be selected for this operation. When a drying-oven—arranged for the passage of a current of air—is not at hand, a few plates can be dried simultaneously, by placing them in a box that can be kept accurately level, and at the bottom of which is placed an open glass half filled with sulphuric acid, as this substance possesses the property of absorbing moisture. When the weather is not too cold and wet, this method of drying answers well enough; but for preparing a large number of plates, a drying-oven through which a current of air can be kept passing is absolutely necessary.

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ENAMELLING PAPER PRINTS.

The following forms a continuation to the details given in our last from Mr. Gibon's "Photographic Scraps":—

Now comes the treatment of a class of pictures that is held in so much terror by many photographers that they refuse to accept commissions for them. I refer to the enamelled photographs, or, as they are more fashionably termed, the glacés. It is true that they are troublesome and unremunerative where the demand for them is only occasional. I was at one time connected with an establishment where three-fourths of all the work furnished to customers was finished in this manner. There, a young man was kept who had but little else to attend to than this glazing business. As a general rule, the results were satisfactory, but, like all other processes where gelatine is made to take an active part, unaccountable mishaps would sometimes assert themselves. The various operations were simplified to the utmost extent. It is of primary importance to secure good glass for temporarily supporting the photographs. A most excellent glass is that which is highly polished on one side, and is furnished for negative making; next, it must be well cleansed. With this glass there is but little trouble attached to the cleaning of it; it is furnished to you in good condition, with papers between each plate. A limited immersion in nitric acid is all that is necessary previous to washing; after that the glasses should be rubbed with Canton flannel moistened with alcohol. Finally, the polished surface is dusted with talc, or shoemaker's soap-stone, and this in turn rubbed off with clean cloths until no visible trace of it is left. It is essentially necessary that the glasses should be entirely free from scratches, sand-holes, or inequalities of any kind. Every mark, however slight, will be faithfully reproduced upon the collodion film. The glasses, when once well cleaned, will give you no further trouble for a long time to come. After successfully stripping off the pictures, the plates are in a better condition for being re-used than any amount of polishing could induce. All that is requisite is to scratch off whatever remnants of the dry film that may be found adhering to the edges. We have used the same plates daily for a month without washing; in fact, until the obverse side became so smeared that it was difficult to see through it. The glasses are to be coated with plain or normal collodion. It should be alcoholic in tendency, and prepared from samples of rather long-fibred cotton; it is better to make it in large quantities, that it may stand for days, and even weeks, before it is wanted. It should be used much thicker than for negative making purposes. A plate should be coated, and when the collodion is moderately "set" it should be laid almost horizontally upon a table; others are to be managed in the same manner. When you have coated a half dozen or more, the first plate will be ready for placing in the rack for absolute drying; this must be accomplished in a room entirely free from dust. It is immaterial whether the glasses are collodionized the day upon which they are desired for use, or a week beforehand.

The proper handling and use of the gelatine is the most important feature in enamelling. Nelson's photographic gelatine, No. 1, is the preferable brand; it is a beautiful preparation, put up in packets, containing the gelatine in almost transparent sheets, free from dirt or foreign matter. It should be cut into smaller pieces, thrown into a clean dish, covered with water, and allowed to swell to its fullest capacity. The water is now poured off, and a gentle heat applied until the gelatine liquefies; it will now be somewhat too thick, but can readily be diluted with warm water.

It is impossible to give exact proportions for these operations; practice alone will teach the operator the most favourable conditions for the work.

You need a table or counter upon which to work, placed near a window, securing to you plenty of light, and in a decidedly warm room. At the left hand end of the table there should be a flat metal dish supported on legs sufficiently high to permit a gas-jet or spirit lamp underneath; this dish should be half filled with water. Another dish for containing the gelatine should be suspended in it. In fact, it is merely a water-bath on the principle of a glue-pot. Alongside there should be a tray, in which you stand a wooden stool with a flat top, somewhat smaller than the glasses to be used (the 8 by 10 size is the most convenient). Near at hand you must have a basin of hot water and a clean sponge. The only other implement is a squeegee, best made of a piece of wood with a rounded edge, well covered with a couple of thicknesses of chamois-skin. The first thing to be done is to strain into the upper dish of the water-bath the melted gelatine. This must now be kept of an even temperature, and must feel slightly hot to the fingers. The pictures must be unmounted. You should have a pile of cards, slightly smaller than the glasses, and much thinner than are used for ordinary mounting purposes (unglazed Bristol-board answers very well); a prepared glass, slightly warmed, is laid, collodion side up, on the stool; a couple of pictures, say cabinets (trimmed, of course), are immersed in the gelatine, together with one of the card-mounts. The pictures, whilst drippingly covered with the gelatine, are quickly placed face down to the collodionized surface of the glass. It is necessary to place them at first in proper position, and to conduct the subsequent removal of superfluous solution and the displacement of air-bubbles with celerity. This is best done with the aid of the squeegee, which should be repeatedly dipped in the hot water. Perfect contact having been insured between the pictures and glass, the cardboard should now be removed from the gelatine, and pressed to the backs of the photographs.

Finally, the back of the card can be sponged with warm water, and the plate with its encumbrances stood in a rack, or hung up on nails to dry; no attempt must be made to hurry the drying, which should take at least twelve hours in a moderately warm, dry room. The surface on the pictures will be found most brilliant, when it is necessary to pass a knife around the edges of the card, and it is removed from the glass with a sharp crackling noise.

The cards can now be trimmed to their desired sizes, and are ready for embossing or cameoing, if they have been printed in the medallion style.

There is no better press for the purpose than the ordinary copying-press used in counting houses, slightly altered. Have the front and back of the top-plate sawed away two or three inches; procure a piece of gutta-percha an inch thick, to serve as a bed-plate. Have the metal mats, or medallion shapes, at least a quarter of an inch thick. Lay a picture, face up, on the rubber, adjust the metal mat, slip under the centre of the press, and apply the required pressure. This is certainly very simple, and easy of consummation.

If desired, the finished pictures can now be glued down to the heavy bevelled card-blocks made for the purpose. A neat appearance, and a precaution against injury to the surface of the picture is taken by attaching a fly-leaf of fine pink tissue paper to it. I believe the described method to be the most rational and practical way of making "glacés," or "abrilliantados," as we termed them.

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VIGNETTING WITH WAYMOUTH'S VIGNETTE PAPERS.

The second edition of the *Practical Printer*, by C. W. Hearn, contains an interesting chapter on vignetting with Waymouth's vignetting screens, which we introduced some years ago to our American photographic brethren. He says:—

"These papers, although they are a great deal in use, are by no means as extensively used as they would be if their value were better known, and, consequently, more fully appreciated by the printer. Some have purchased, used, and condemned them without the least sense of fairness in their judgment, as they have used them incorrectly; whereas there are many others who, having used them once, would not be without them. The writer, knowing full well the difficulties that printers, as a class, are obliged to contend with in vignette printing, to say nothing of the time it takes to make the vignette forms from cardboard, &c., would here briefly call the attention of those who are not already aware of it, to the advantages to be derived by the use of the Waymouth Vignette Papers.

"The impression gained ground among the photographic fraternity a few years ago, that all that was necessary in using these vignette papers was to paste the corners of the paper (after having matched the vignette opening to the figure) on to the back part or glass side of the negative, and then place the frame out to print in the sunlight, thinking, possibly, that the blending of the vignette paper would indicate its exact counterpart in softness in the picture; and because it did not, they were disappointed, and the 'Waymouths' were rejected. If they are to be judiciously used, it is necessary that the paper vignette should be removed from the negative all of the way from one-half to one and a half inches, depending somewhat upon the negative and the degree of softness desired to be obtained. The frame is built up with strips of backboard, and the vignette paper fitted to the negative through transmitted light, and then it is tacked in its proper place. They are easily adjusted, and have the advantage of being already made, thus saving the time of the printer in cutting this and that size form out of cardboard, which, when done, is not only a waste of time, but is also—except, perhaps, in very rare cases—not nearly as good.

"The sizes are very well arranged from No. 1, which is intended for vignetting large locket pictures, up to the largest size, for vignetting four-fourth heads, together with the intermediate numbers, which answer well for various sizes of card and cabinet negatives, either for bust, three-quarter length, or full figure.

"There is another advantage gained by using these papers when 'flashed' or 'grayed' prints are to be desired (the pose being such as to admit of it), and it is the facility with which the graying is done, simply by removing the tacks from one end of the vignette paper, bending the paper back out of the way, and then printing the negative as though it was a plain print, for a minute or so. This has the result of softening still more the edges of the vignette on the picture, besides also printing the rest of the negative very slightly, thus giving to the whole print a very delicate effect of a vignette which had blended very softly and gradually even to the very edges of the print. When through flashing, the vignette can be turned back again to its place and retacked, without the extra trouble of readjustment.

"If the figure is a three-quarter or a full-length of a lady, 'in exterior,' with the proper arrangement of accessories and background, the result, when nicely done, is indeed very beautiful, as it softens down those parts of the background which are so necessary to give an artistic effect to the figure in relief, besides obviating the bad effect of the white edges of the vignette print, as it would be if not grayed; or if grayed in the regular way under a plain glass with tuft of cotton, &c., it then overcomes the objection of seeing the trees, rocks, &c., which start out boldly near the figure, end in a dead grey hue, without the least indication of detail towards the edges of the print.

"If the print is a plain bust, then 'graying' under a plain glass is what is desired, and is best, because the negative cannot be exposed as a plain print after the vignette is nearly done, as the figure must not show down; but for a three-quarter or full length pose, with a suitable ground, it is excellent. It is a very pretty effect if the majority of the portrait cabinet negatives of the class just described are printed in the vignette style, and then flashed just enough to be of a light, delicate tinge after finishing. It gives an elegance to the prints that the customers cannot fail to admire.

"In adjusting these vignette papers on to the built-up portion of the frame, for vignette purposes, care should be taken that the top of the vignette paper is not placed too high upon the negative, but placed exactly opposite the top of the head of the portrait. If this is not looked to, the printer is likely to print a dark spot right over the head, and all subsequent flashing will not remove its hideous appearance.

"If this flashing is done only slightly, then very great care should be taken to have the vignetting especially soft, by building the frame fully an inch or more, as this delicate second printing does not suffice to soften the edges but very slightly; and although, if flashed darker, the outlines of a harsh vignette picture could be softened considerably, in the case of a lightly flashed picture it would by no means answer.

"In using these vignette papers, after a while the tissue-paper is likely to have little breaks and tears occur, which necessitate patching up in order that these places will not print in the picture. In commenting with me one day in regard to these little annoyances, a friend of mine, Mr. W. F. Kidney, of Chicago, a most excellent operator and poser, suggested to me the simple plan of waxing a suitable piece of white tissue-paper, and by means of gum-paper to attach it to the exterior side of the vignette paper, so that in case of any accident the waxed paper would receive it, thus saving the 'Waymouth.' When tried, it proved most effectual, the difference in time of printing being hardly perceptible.

"One more suggestion in regard to flashing. Do not attempt to flash very lightly if the figure and surroundings are quite dark in drapery. In such cases it would be better if the flashing were carried a trifle further; but if the drapery and neighbouring surroundings are light, then a very soft vignette, very slightly flashed, makes the most beautiful, delicate picture imaginable."

LAC.*

Lac, in its raw condition, is, as is well known, found in India incrusted round the twigs of the trees in which the insect feeds. The twigs are generally, for convenience of transport, brought to market cut up in lengths of two or three inches, and it is probable that a great deal of material is wasted in this process. The objects of the manufacture are, first, to separate the resinous incrustation from the wood; second, to free the resin from the colouring matter; third, to convert the resin into what is known as shellac; and, fourth, to form from the colouring matter cakes of dye, known as lac dye. As generally practised, these processes are conducted in a primitive manner. Mr. O'Connor, from whose notice upon the Indian lac in all its branches the following particulars are taken, was enabled to see the extensive lac factory belonging to Mr. Elliott Angelo, of Cossipore. The manufacture is there conducted on an improved and civilized system by the aid of machinery worked by steam power. The lac is first separated from the twigs by the action of rollers, worked by steam. Of these rollers there are three sets, each consisting of an upper and an under roller with a sieve attached. Between these the twigs pass from a feeder, and the lac is, by the turn of the roller, separated from the wood and broken up, falling on to a sieve, while the twigs are thrown off aside in a heap. If the lac has not been sufficiently broken up by the first roller to pass through the sieve, some of the twigs not having been separated, it passes on to the second roller, and goes through the same process, passing again, if still not fine enough, to the third, whence the lac is dropped, as the sieve is filled, into a series of small troughs arranged in an endless chain working with the machine, and is projected thence, as the chain moves, into a heap upon the floor. The twigs are thrown off to a platform on the other side. These are afterward again examined by women, and all the remaining lac separated by hand, and as far as it may be worth while used in manufacture. The refuse is bought by natives for the manufacture of various articles made of lac. The sticks are used for fuel in the furnace of the steam engine.

The lac is now placed in a horizontal cylinder furnished internally with arms arranged on a bar passing through the cylinder from end to end. These arms are worked by steam power, and their action, combined with water, with which the cylinder is filled, breaks up the lac into very small pieces, and separates the colouring matter which forms lac dye. Lime is frequently employed to assist in the precipitation of the dye when the water is not naturally impregnated with lime. In the liquid thus obtained the lac is left to soak for twenty-four hours in a large vat, the liquid being then drawn off, by the removal of plugs, into a vat on a lower level, and there left to settle in the same way as indigo, the colouring matter being precipitated to the bottom. The clear water at top is drawn off, and the sediment, after having been passed through a strainer—much of the same nature as that used by papermakers for the straining of pulp—is finally allowed to settle and consolidate, when it is pressed in frames into cakes, which are afterward dried in the sun. These cakes are the lac dye of commerce.

The lac, now called "seed lac," after maceration, is thoroughly melted in a close vessel heated by steam, and thence conducted into open shallow troughs, also heated by steam, where the melting continues. Some resin is here mixed with the lac, to act as a flux, and to prevent the lac from burning and adhering to the vessel. The resin, which is probably useful for this purpose, flies off, at least in great part, during the process of ebullition.

Ranged round the troughs are a series of zinc columns, inclined outward at an angle of 45°. These columns are hollow, and, being supplied by pipes with tepid water, are maintained at a certain temperature. They must never become too hot, or the fluid lac would not consolidate; nor must they become too cool, for then the lac would harden at once, and break up into small fragments, which would adhere to the surface of the column. A quantity of the melted lac is now taken up by a workman in the concavity of a piece of plantain bark—this being the material best adapted to the purpose—and flung on to one of the columns. Here the liquid mass is spread evenly and thinly over the surface by a man, who makes use, for the purpose, of a leaf of the pineapple plant, or some other tough, fibrous material. The leaf being held in both hands, its edge is drawn over the material until the mass is properly spread over the surface of the column to the required degree of fineness. It begins to consolidate at once, and becomes of a pliable, leathery texture. As soon as the lac is thoroughly consolidated it is taken off by a workman while still so hot that it would burn the fingers of any person not accustomed to the work, a considerable section of the upper portion of the sheet of lac being torn off, because it is thicker there than in the rest of the sheet, and thrown back into the trough to be melted again. The sheet is placed on a rod held in readiness by a woman, each extremity of the sheet hanging down, like a towel on a rack, and the whole is hung up to dry in a large drying shed, the rods supporting the lac being ranged on supports running across the sheds from side to side, just like a tobacco drying house. The next day it is fit for dispatch, and is then packed in boxes and sent away. The various qualities of shellac are known by different names and marks, and there is a considerable range in prices, from "Fine Orange DC" to "Livery," "Garnet," "Native Leaf," and "Button." The last quality is so mamed from the lac not being made in sheets, but dropped from a height and solidifying into masses.

In India lac is used chiefly for the manufacture of bracelets, rings, beads, and other trinkets, worn as ornaments by women of the poorer classes. The lac is bought in the bazaar, and, after having been melted, it is mixed with vermilion, arsenic, and lampblack for colouring purposes. It is also used as a varnish, in many cases the dye being left in the lac to produce a coloured varnish; by the turners of wooden toys, which are coated neatly with coloured compositions, in which lac predominates; in laquered ware, and by goldsmiths for the colouring of the metal. In Burmah it is also employed to fix the blades of knives, and similar instruments, in their handles. In Bombay Presidency and elsewhere lac is also used in manufacturing grindstones, for which purpose three parts of river sand and one part of clean seed lac are mixed over a fire, the mass being formed into the shape of a grindstone, having a square hole in the centre. This is then cemented to the axis with melted lac, and the stone, having been moderately heated, is caused to revolve rapidly, when it can easily be turned down to shape. The sand should be finer and the proportion of lac greater when the stone is only required for polishing. Japanese lacquered ware is made of an entirely different material, being a varnish obtained from the gum exuding from certain trees.

In Europe, lac is largely used in the preparation of varnishes and by hatters. The body of all the silk hats in common use is rendered stiff and waterproof by the liberal application of a composition of shellac, sandarac, mastic, and other resins, dissolved in alcohol or naphtha. The brim is always imbued more thickly than the body with this varnish.

Lac is also extensively used in the manufacture of sealing-wax, which is formed of an amalgam of shellac, Venice turpentine, colophony, and colouring matter, the quantity of lac used being equal to that of all the other articles put together. Lac also enters largely into the composition of lithographic ink, and in the preparation of lake (the name is derived from "lac"). Lake, however, is also made with madder and cochineal. Lacquer is based on a solution of shellac in alcohol, coloured with gamboge, saffron, &c. It is used to give a golden colour to brass and other metals, and to preserve their lustre. In India, lac dye is mostly used to dye silk, and to some extent it is also employed in the dyeing of leather. It is not much used as a dye for cotton, on account of the expense.

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* *Scientific American.*

HINTS ON PHOTOGRAPHING ROOM INTERIORS.

BY R. TUDOR WILLIAMS.*

The above branch of our art has been sadly neglected, yet it is capable of yielding much profit to the professional and pleasure to the amateur, who may, by its means, carry away in an interior of a drawing or other room many pleasant associations of home, or of times passed beneath the roof of his friends.

Ceilings, carved oak panels, stencilled walls, &c., are often required to be photographed by private gentlemen, architects, and decorators, and, as there is often a difficulty in obtaining such pictures, and (as the wise always use the experience of others) my experience which has been much varied in interior work, may be of use to some of my brethren in the black but beautiful art, I will, therefore, state, in as few words as possible, how I have successfully employed wet collodion for this purpose.

The collodion should be aged, or ripe, for this purpose, certainly not less than six months old; but I much prefer it when from twelve to eighteen months old, as there is less chance of failure in the form of mat silver. Mr. Blanchard has stated with truth that the addition of small quantities of bromide of cadmium to the collodion permits of very long exposures. This is certainly very useful when using a newly iodized collodion, but collodion so treated I have never found so good as a really ripe sample.

I have given exposures of three hours when an old collodion has been used, and on developing have found the negative quite as good as if taken under ordinary circumstances.

The bath should be forty grains to the ounce, iodized in the usual way, and slightly acid with nitric acid, and would be better if not an old one. The time of sensitizing will vary from three to five minutes, according to the time of year. On removing the plate from the bath, well drain, wipe the back, and place in the dark slide, in the lower corners of which should be placed small pieces of blotting-paper, and the groove in the bottom of the back should also be filled with blotting-paper. Then back the plate with a piece of damp, dark-coloured felt: this tends to keep the plate in good condition for a long time. In hot summer weather iced water will be found of great advantage for damping the felt. The developer in this case should be as strong as possible, and be compatible with cleanly working; but I rarely find it necessary to increase the strength beyond the full strength of the formula recommended by me in the Photographic News of July 9th, 1871.

I always intensify and fix on the spot.

The lens should not be directed immediately opposite a window if it can possibly be avoided, as the window becomes so very much over-done as to entirely spoil the picture; but if necessity compels such a mode of working, the way of overcoming the difficulty (if there are other windows in the room giving sufficient light) is to cover the window from the outside with any kind of material that will effectually stop the light, and when the exposure is almost completed, uncover the window, and allow sufficient time of exposure to obtain the necessary details in the window itself. By this means satisfactory detail may be obtained of all things seen through the window.

It is necessary, before taking a room interior, that the furniture should be so arranged that chairs, tables, &c., immediately in the foreground, should not appear too gigantic, and those at the greatest distance like toys. This is easily managed by placing the furniture in the foreground at a greater distance from the camera, and those at the greater distance off brought as near as possible, at the same time bearing in mind that each piece of furniture must be so placed as to bear the same relation one to another as before the photographic arrangement was made, otherwise the photograph so produced will be quite unlike the room as generally seen.

Unfortunately, the two most suitable lenses for interior work cannot, as a rule, be employed for photographing room interiors, as the angle of view obtained with either the triplet or rapid rectilinear is generally insufficient for the purpose, and the wide-angle rectilinear can rarely be used on account of its slowness of action. On the whole, the lens I have found the most generally useful is the wide angle landscape for this purpose; although, of course, it is impossible to avoid distortion, yet it may be so managed with care that an ordinary observer would fail to notice it.

If Mr. Dallmeyer, or any of our opticians, would make a lens to include a large angle, and be of the same rapidity as the rapid rectilinear, I feel quite sure it would meet with the ready sale that would amply pay the maker for introducing such an article.

Before finishing the subject of photographing room interiors, it may not be out of place to offer a suggestion or the preparation of plates that will keep for twelve hours or more, and be very little less sensitive than wet collodion. But I must say my experience in this direction is of a limited nature, some half-dozen plates being the extent of my experiment. Proceed as follows:—Coat and sensitize in the usual way; on removing the plate from the bath, wash in distilled water first; then thoroughly wash in soft water; and, finally, flush with distilled; then pour over a mixture of honey and water, one part of honey to seven of water, allowing this mixture to flow backwards and forwards over the plate for about half a minute; it is then ready for exposure, which will be about half as long again as for wet collodion.

To develop thoroughly, wash away the mixture of honey and water, and develop with an iron developer to which has been added a few drops of a thirty-grain solution of nitrate of silver; the development will proceed almost in the same manner and nearly as quickly as an ordinary wet plate. I have a few negatives so produced that are so satisfactory that it will induce me to make further experiments in this direction.

I intend trying alkaline pyro development for the above plates—with what success I will let you know in due time.

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[*] In consideration of many recent inquiries for hints on photographing interiors, we reprint the above interesting article from our Year-Book.—Ed.

Talk in the Studio.

Photographic Society of Great Britian.—The opening meeting of this Society for the session will be held on Tuesday next, Nov 12th, at the Gallery, 5a, Pall Mall East, when the presentation of the medals awarded will take place, after which a paper by Mr. Leon Warnerke will be read: "Photographic Notes from a Travel in Russia, with Exhibition of various works, apparatus and materials;" also "Photographic Experiences in Cyprus," by John Thomson, F.R.G.S.

Photograpic Exhibition.—The date for closing the Exhibition of the Photographic Society, at 5a, Pall Mall East, has been altered from Tuesday, Nov 12th, to Saturday, Nov 16th. The Exhibition will therefore be open for the whole of next week

South London Photographic Society.—The Annual Technical Exhibition Meeting of this Society will be held at the Society of Arts, Adelphi, on Thursday next, November 14, at seven o'clock, admission free. Also the Annual Dinner will take place on Saturday, November 16, at the Café Royal, Regent Street. Particulars of both these meetings may be obtained from the Hon. Sec., 57, Queen's Road, Peckham, S.E

Photographs of Cyprus.—Mr. J. Thompson, F.R.G.S., has just returned from Cyprus, where he obtained a very complete series of this interesting addition to the British Empire. Apart from the political interest at present attached to this island, its historical associations and its natural beauties are claims for especial attention. About thirty of Mr. Thompson's photographs are at the present time hung in the Photographic Exhibition in Pall Mall, where they have been kindly sent by Mr. Thompson for show until November 16th.

Phototype.—Amateur photography does not, as a rule, flourish in continental Europe. We receive, however, from time to time examples of very excellent work from a Portuguese amateur, Senor Carlos Relvas, of Gollega. We received a few days ago a still life study skilfully grouped and photographed. The print is produced by *Phototypie*, manifestly one of the collograph processes, and is an admirable example of this class of work.

Engraving with Electricity.—The applications of electricity seem to be unlimited. We are informed that an ingenious inventor has succeeded, after many tedious trials, in constructing a machine for engraving by means of electricity. The design is placed under one, and the plate to be engraved under the other pole of the battery, the latter being supplied with the engraving tool. When the battery is set in action, an ivory button moves horizontally over the design, and since the latter is made a conductor, thereby closes the circuit and affects the metal under the other pole, producing a *fac simile* on the plate. If it be desired to produce a relief plate, it is only necessary to reverse the poles of the battery, and the functions performed on the design and plate will be reversed likewise.—*Papier Ztg.*

Lichtdruck Films.—The following method is used by the Berlin Institute for Photography, for removing negative films from the glass, a process necessary in working the *lichtdruck* method. Before collodionizing, the plate must be covered with a weak solution of *caoutchouc*. After fixing and washing, the negative must be somewhat warmed by hot water, and then a solution of gelatine, about ten per cent., is poured on it, carefully avoiding the formation of air-bubbles. When that gelatine film is dry (the negative must be dried in a horizontal position), the negative will be retouched as usual, and then the borders being cut with a knife, the pellicle will be easily drawn off.

Scratches in Burnishing.—A correspondent of our Philadelphia contemporary says:—"About two years since I was very much troubled with very fine scratches in burnishing, different from those caused by roughness of the burnishing tool. Another proof that the cause lay outside of the burnisher was, that two or three, perhaps, would burnish all right, then one scratched badly, next all right, and so on through the lot. I asked several the cause, Mr. Bass among the number, but none gave me any satisfactory reason. I finally found the cause to be, that the prints were allowed to get too dry before burnishing, and the remedy I used was as follows: After mounting, the moisture should not get out of the prints before burnishing. As soon as the prints begin to curl towards the picture, I pack them one upon another. My first plan was to place them in the cellar until ready to spot; while doing this I only expose one print at a time, keeping them packed. After spotting, lubricate with soap and alcohol (I find wax, spermaceti, &c., to give, in my experience, a veiled appearance), and spread out in the cellar upon something clean; I use a cloth stretched upon a small frame, where they should remain until ready to burnish. A superior burnish will result if they can remain twelve hours after lubricating, as directed, spread in the cellar. I have since made another improvement, substituting for the cellar a tight tin box, which I had made large enough to hold my prints flat. Care must be taken not to have the prints too damp. I run them through, lightly, twice across the burnishing tool, until all are through, then run about four times again, commencing with the first; I run the first thin."

Restoring Deteriorated Albumen.—The English papers publish an article on the restoration of deteriorated albumen which has become more or less insoluble. It is said that its primitive qualities may be restored by digesting it at a temperature of one hundred and five degrees Fahr., in water containing two and a-half per cent. of hydrochloric acid, and seven and a-half parts of fragments of the membrane of the stomach of the calf or sheep, which acts by the pepsin which it contains. After digesting at this temperature for thirty-six hours, the liquid is filtered, and its acid carefully neutralized by the gradual addition of liquid ammonia. The albumen has thus undergone a regeneration, and is found as such in solution. It is possible that several animal substances submitted to the same treatment may be gradually transformed into albumen on being dissolved. It might be worth while to make this experiment.—Dr. Phipson.

Photographic Note.—*Funny Folks* says:—"Justice is all luck. A man has just been sent to prison for taking a picture, while Valentine Blanchard is at large and prosperous, though he has, to our knowledge, gone on taking pictures for ten years!

To Correspondents.

A. C.—There has been no book devoted to the consideration of reflectors. The size depends much upon convenience and the immediate purpose to be answered. If for general use, and throwing reflected light on the whole figure, the reflecting screen may be about six or seven feet square. If for heads only, it need not be so large. We should cover it with bleached calico, or any kind of calico or canvas papered with white paper.

Smudge.—Never having had a case of the kind to deal with, we can only suggest experimental remedies. It is probable that a solution of cyanide of potassium would remove it; but it might also injure the image. If you apply a solution, say ten grains to the ounce of bichloride of mercury, this will turn the deposit white, and slightly intensify the dense parts of the image, so that it will print the light, being little obstructed by the deposit when it is made white.

Sub. ab Initio.—Thanks. We shall have something to say on the subject shortly. There is no similar danger with carbon prints as worked at present.

B. R. J.—A finer colour is generally obtained in wet collodion transparencies developed with pyrogallic acid than with iron development. But, as a rule, gold toning improves either. A neutral solution of chloride of gold, one grain to the ounce, answers well for toning.

Operator.—There is no definite law or custom, so far as we know, which settles the hours of labour in a photographic studio. As a rule, it is decided by agreement between employer and employed, precisely as the amount of remuneration is settled. There is no especial obligation, beyond that suggested by mutual good feeling, by which an operator is bound to impart his formulæ to his employer; but an operator is expected, as a rule, to adopt the formulæ and mode of working which his employer shall direct

Sel D'or.—The colours employed to tint Daguerreotypes were used in a state of dry powder, which adhered to the surface on being applied skilfully with a gentle circular friction, a sable pencil being generally employed. Sometimes the colours were mixed with a little powdered gum or resin to secure better adhesion; but, as a rule, they adhered in virtue of their fine sub-division by grinding. A little artistic skill was, of course, necessary to produce a good result. The same mode of colouring has been successfully employed with collodion positives, and occasionally to paper. But it is not well suited to the latter.

Querist.—The term "ordinary iron developer" is very indefinite; but if we were instructed to use an ordinary iron developer, we should use fifteen grains of the iron salt, twenty minims of glacial acetic acid, and one ounce of water. This, as a rule, will give good results.

G. M. R. G.—A rapid portrait lens, one the C series of the maker you name, will answer capitally for bust portraits: better than for full-length figures.

Inexperienced.—For all large negatives we prefer patent plate for safety; but it is quite possible that, in careful hands, crown glass may serve, which is, of course, lighter to handle and lighter in cost. 2. If you wish to transfer a negative film to paper, for printing purposes, a piece of thin Saxe paper will answer well. It should then be waxed at the back. 3. As a rule, wet plates are used for making enlarged negatives from transparencies; but in some cases an enlarged transparency is used, and printed by contact on a dry plate. Any kind of dry plate may be used; that with which you are most familiar will answer best.

J. R. M.—Various modes of securing great rapidity have from time to time been proposed; but none have entered into general practice. That to which you refer was probably the following: Dr. Kaiser describes a new silver sensitizing bath which gives extreme sensitiveness, three times as much as ordinary baths. It is prepared by dissolving 250 grammes (8 oz.) of nitrate of silver in 1 litre of water (35¼ oz.), adding as much iodide of silver as it will dissolve. This solution is evaporated to dryness, and the double salt of iodide and nitrate of silver is melted, but not fused. When cold, the melted salt is dissolved in ten parts of distilled water, and filtered. If the proofs are slightly fogged, add to each 100 grammes of bath solution a few drops of a concentrated alcoholic solution of iodine. The plates are developed with

Concentrated solution of sugar of milk ...	8 parts
Protosulphate of iron	2 ,,

W. Barry.—In our next.

Several Correspondents in our next.

The Photographic News, November 15, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

Photographs Taken from the Captive Balloon in Paris—M. Pellett's Photo-Copying Process—The Afghan War and the Ordnance Survey Office at Calcutta.

Photographs Taken from the Captive Balloon in Paris.—Photographs of Paris taken from the captive balloon on the *Place du Carrousel* are now to be purchased in that city. The delay which has taken place in their long promised appearance seems to have been due to the difficulties inherent to balloon photography. The pictures are naturally very interesting, and, barring some indistinctness, may be regarded as particularly successful. The size and steadiness of the Paris balloon must have rendered the taking of these pictures more easy than usual, for in lighter ærial machines the gyrations and movements are so constant that the most minute fraction of a second only must be given for an exposure. In the case of the monster Paris balloon there is a great degree of steadiness on a favourable day when at the end of its tether, and the fact that upwards of a score of people find room in the car proves that it must be as quiet as any machine of the sort can be. Mr. Woodbury, on a recent visit to the French metropolis, went prepared to make a few exposures in the balloon, and had provided himself with some of Swan's rapid dry plates to work in the car. But he found that "the right to photograph from the balloon" had already been acquired by a Paris photographer, and Mr. Woodbury, therefore, could not carry out his experiment. The Giffard balloon has been put to other important uses, it seems, and among others, the aneroid barometers, which recently took medals at the Exhibition, have been tested by a journey into the air. It was then discovered—and owners of pocket aneroids should remember this, who employ them for making ascents—that very few, even of these first-rate instruments, recovered their original readings (after making the ascent) until after the lapse of a considerable time.

M. Pellett's Photo-Copying Process.—A photographic process, the invention of M. Pellet—whose name may be familiar to our readers in connection with investigations upon guncotton and other explosives, that have been conducted by the two French chemists, MM. Champion et Pellett—has lately made its appearance in this country, and, to all appearances, it will be largely adopted by engineers and draughtsmen. It seems to be a modification of Sir John Herschel's process, which, many of our readers may remember, produces white characters upon a blue ground. M. Pellet's process, on the other hand, secures a white ground, and the printing upon it is in blue. Naturally, one would think the Pellet process is simply a reversal of the Herschel or Cyanotype method; for, of course, it would be possible, by employing as cliché a black sketch with white lines, to produce what M. Pellet produces, by simply laying under it paper treated with the prussiate of potash and citrate of iron. But M. Pellet does not do this. Any tracing executed in the ordinary way—namely, by drawing black lines upon transparent paper—can be employed as cliché, and will give, on printing, a blue lined drawing upon white paper. M. Pellet must therefore prepare his paper differently from the ordinary way of treating it, which, as our readers may remember, is to make up a solution by dissolving in two ounces of water:

Citrate of iron (or ammonio-citrate)...	140 grains
Red prussiate of potash	120 „

This can be kept for some time, if well sheltered from light, and is applied to paper by means of a tuft of cotton wool, or broad camel's-hair pencil, the surface, of course, being dried in the dark. To print, the paper is exposed to light under the tracing, the surfaces being pressed together by means of a glass plate, and the print is afterwards fixed by washing in clean water for a few minutes. This paper gives very sharp impressions, and affords an easy and rapid means of copying tracings, tables, calculations, &c., with absolute accuracy; the copies may not be so fine and vigorous as if made by hand, but they are, of course, pre-eminently trustworthy and without error, which cannot be said of clerical productions. At the same time, it is doubtless preferable, in many cases, to have a white ground instead of a blue one, and in this case the paper of M. Pellet will be welcome. That chemist has, we believe, parted with the right to manufacture the paper in this country to Messrs. Waterlow and Son, of London Wall, and the paper will be prepared ready sensitized for immediate use. From the fact that we have the well-known Prussian blue reaction, there is little doubt about the presence of prussiate of potash upon the surface of the paper; but what are the precise reactions inherent to M. Pellet's paper we do not know.

The Afghan War and the Ordnance Survey Office at Calcutta.—The approaching Afghan war—for it is very certain that some advance will be made by our troops on the 20th inst.—has made the Ordnance Survey Office remarkably busy. Captain Waterhouse, whose name has frequently been quoted in these columns, is the Deputy-Surveyor-General of India, and upon him will fall most of the work of reproducing maps and plans of the enemy's country. Now-a-days, not only every staff officer, but every officer of superior rank, is supposed to be provided with a map of the country through which he may have to pass, and hence photography is made use of to an enormous extent in war time, for the purpose of multiplying such maps as may be in existence. Capt. Waterhouse, we believe, is employing the collotype method largely in the printing off of plans, and in this way he secures much finer and more delicat results than in the case of photo-lithography or photo zincography. The fine shading, which would be very difficult to produce if the transfer were applied to a stone or zinc surface, is readily printed from a gelatine block; and the map-printers at Calcutta are already well versed in this kind of printing. Where a delicate map or plan is to be reproduced of exactly the same size, the copying is better done with a piece of Warnerke tissue than with the camera. The front of the map is placed down upon the tissue in the printing-frame, and exposed for half a minute or so to diffused light, according to the thickness of the paper upon which the original map is printed, for the light rays have first of all to penetrate the thickness of the paper. In this way a negative is produced of the most delicate character, of the same size precisely as the original, and without any difficulties as to lens or to apparatus, for, as everybody knows, the focussing of the image, and the securing of the camera properly at right angles to the map, are matters entailing both labour and skill. Moreover, the Warnerke negative is on a film, and may thus be placed more closely in contact with a hard surface than if it were upon glass; while both silver and carbon impressions may be secured, very finely printed. In the Ordnance Office at Calcutta, however, most of the maps are drawn specially for the purposes of reproduction, the lines being particularly black and clear, to ensure the taking of good negatives. Anyone, by the way, specially interested in the establishment, should get Captain Waterhouse's pamphlet on "The Application of Photography to the Reproduction of Maps and Plans by the Photo-mechanical and other Processes," a work which first appeared in the Journal of the Asiatic Society of Bengal. There are few indeed that can have any idea of the extent to which photography is thus put in the Surveyor-General's Office at Calcutta. For instance, in the year 1877, Captain Waterhouse tells us that in all no less than 244,593—as nearly as possible a quarter of a million—of sheets were printed at the Office, involving 2,725 transfers to zinc or stone. As many as 5,398 photo-transfer prints were produced, while the total of negative plates is represented by the substantial figures 5,343. Besides these photo-mechanical prints, some hundreds in carbon and silver were also produced under Captain Waterhouse's direction, so that the Calcutta Office may well take rank with any Ordnance Map Department in Europe.

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ON RECOVERING WASTE SILVER IN PRINTING.

BY W. HORSEMAN KIRKBY.*

It has often been a matter of surprise to me that so few make any attempt to recover the waste silver which usually goes down the sink during the operation of toning silver prints.

I am sure it will repay recovering, even to the amateur who works on a small scale, unless, indeed, it is on a *very* small scale. As to professional photographers, I fancy most save their residues in some form or other, though, on lately conversing with one in a large way of business, I was surprised to find he made no attempt to save any portion of the large amount of silver that was constantly being thrown away; for he considered that the amount, if recovered, would not repay him for the time, trouble, and expense of such recovery.

In order to test this point I have recovered the silver from the printing of a known quantity of prints, and I will now lay the results before you. The operations were performed in a very rough-and-ready manner, and therefore the result will probably not show as favourably as if more care had been taken and a larger quantity of residues had been experimented upon.

I operated on forty-eight (eight by five) prints, or a quarter of a quire of a commercially sensitised paper. By adding a little common salt to the first two waters in which the prints had been washed before toning I obtained fourteen grains of chloride of silver ($Ag\,Cl$). By adding a little solution of sulphide of potassium, or liver of sulphur, to the fixing bath, I obtained seventy-six grains of sulphide of silver ($Ag_2\,S$).

Now, in 14 grains of $AgCl$ there are 10 grains of pure silver,
And in 76 „ Ag_2S „ 66 „ „
—
Total......76 grains of pure silver,

This is equivalent to 119 grains of nitrate of silver ($AgNO_3$); and taking nitrate of silver at three shillings per ounce, its value is tenpence, or twenty per cent. of what the sensitised paper cost me.

But, properly, the percentage should be taken on the amount of silver in the paper originally, and should not include the cost of the albumenized paper. I have no ready means of ascertaining this, but I imagine it would be about forty to fifty per cent., and probably more when larger quantities are operated upon.

◆

A NEW CURE FOR BLURRING.

BY REV H. J. PALMER, M.A.*

At the October meeting of the Liverpool Amateur Photographic Association I stated that my experience during the past summer with my gelatine films had convinced me that their entire freedom from the nuisance of blurring was due to the slight yellowish tinge of these sheets. The idea naturally occurred to me that if we could obtain glass of this particular colour, for photographic purposes, from the manufacturers, we should at once put an end to halation of all kinds. Since the meeting in question, the kindness of Mr. J. A. Forrest has enabled me to test my theory thoroughly; and the result of my experiments is, I am glad to say, a complete success. Mr. Forrest supplied me with specimens of glass of almost every variety of orange and yellow; but I selected for my purpose those only which were of that slight yellowish tinge with which all workers in gelatine are familiar, and of which an example readiest to hand may be found in a gelatine lozenge.

I coated my plates with gelatine emulsions of two kind. viz., one which gave a very slow but dense film, and on made from Kennett's pellicle, which was moderately rapid I chose a subject as a test which is infallibly productive of the evil with every kind of dry plate I have tried, and especially so with gelatine. This subject is the interior of a church, through the great east window of which a flood of light is poured, which usually obliterates all signs of mullions and tracery. The exposures were made under conditions of light and atmosphere which are invariably provocative of blurring in its worst form. The sun was shining brightly; but the wind was in the east, and the air filled with haze. In every case the test proved entirely satisfactory. The tracery and design of the window are visible in their minutest details, and not the slightest trace of halation exists anywhere in the picture.

This was conclusive, to my mind, and the only thing that still remained to be done was to ascertain if the yellow tinge of the glass would prove an impediment in the process of printing. This, however, was not the case, either as regards the time occupied in the process, or in the brilliancy or excellence of the results. The prints were not more than a few seconds longer than those produced from negatives on ordinary glass, and the results seemed to me to be even better than would have been the case in dealing with a negative of similar density on a white glass plate.

The cost of these tinged glasses need not be greater that that of those in ordinary use, and I shall hope to find that some enterprising manufacturer will be found who will be willing to supply us with glass of this kind, and thus relieve us of all further trouble and difficulty in our efforts to get rid of the nuisance of blurring.

◆

A CURIOUS INCIDENT IN CONNECTION WITH PAPER ENLARGEMENTS.

BY F. A. BRIDGE.*

A few days since, at a committee meeting of the South London Photographic Society, I happened to mention a curious circumstance that occurred to me, and it was then suggested that as none of the gentlemen present could account for it, I should bring the matter before our meeting to-night. This, with your permission, I shall now be happy to do.

A short time ago I was engaged working a developed paper enlargement by artificial light, and had sensitized the iodized paper, and exposed it whilst wet in the usual way, when (much to my surprise) directly the developer came in contact with the paper, the sheet assumed a brown colour, which so rapidly darkened that in less than a minute the entire surface was a beautiful purple black.

Now the paper used was part of a batch iodized some time before, and the developer a portion of ordinary stock solution. The sensitizer, however, I found had been made from a fresh parcel of silver, and, curiously enough, the glacial acetic acid was the first taken from a Winchester only recently supplied by a well-known firm.

The fault, then, clearly rested either with the silver or the acid. Another sample of silver and the same acid produced similar results, but the same sample of silver and acid obtained from another source cleared up the difficulty, and everything worked as usual.

I will just show you the sort of pictures I generally obtain when working in a similar way, and also two specimens of the blackened paper, to endeavour to find out the cause of which I have brought the matter before you.

We have usually considered glacial acetic acid as an article rarely contaminated with anything injurious to photography, although occasionally the most peculiar results have been attributed to it—none, possibly, much more curious than that I have just alluded to.

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* Read before the Liverpool Amateur Photographic Association.

* Read before the South London Photographic Society.

PRESS NOTICES OF THE PHOTOGRAPHIC EXHIBITION.

(*From the* Illustrated London News).

We miss from the wall some of the most valuable contributors of former years, particularly of the class of amateurs whose legitimate success was due to their aiming at purely scientific and artistic results, without resorting to any artifice to secure a trading profit. We think the Society would act wisely by not only rendering (as already done) ineligible for a medal photographs "improved" by hand, but by limiting the works admissible in the exhibition to pure photographs from unsophisticated negatives. At all events, any "retouching" of portraits, any additions of skies to landscapes, any "combination" contrivances—in short, any falsification of the direct products of the camera from nature, taken at a single sitting, should be distinctly avowed in the catalogue. This would prevent the Exhibition from degenerating into a show-room and advertising medium for the benefit, principally, of those who are least scrupulous in the means adopted to catch the eye and flatter ignorant or perverted taste. Take, for example, the portraits. We may safely say that nearly the whole have have been touched up by hand; in most cases the flesh has been stippled all over, though the touches may be almost too minute for the eye to follow. It is this "retouching" which gives the waxen hue or the woolly or puffy surface to the flesh, the insipid expression, the characterless want of detail, the glaring eyes, that render so much photographic portraiture comparative worthless. A remarkable illustration of the truth of our remark is afforded in the present display. We allude to two photographs by Mr. G. Nesbitt, from a negative portrait of a man in slouched hat and swathed cloak, called *The Brigand*. The first (142) is "untouched," as stated in the catalogue; the other (202) has undergone the usual manipulation. In the former the eye may, it is true, lack due brilliancy. The lips may be too white, owing to the diffusion of the light on smooth surfaces in photography; the skin may appear unnaturally coarse; and freckles and the colour of the hair may be much deepened in tone, because, while photography is almost insensible to the softening, pearly tints, it greatly exaggerates in intensity the yellows and reds. Nevertheless, an artist would not hesitate for a moment in preferring the former. The difference is that between a painting by Rembrandt in his more vigorous manner, and a tame, overwrought miniature. Several other portraits by Messrs. Lombardi, Slingsby, Boucher, and Lock and Whitfield possess much merit, making due deduction for the retouching; and the costume portraits of Mr. Shuter may afford suggestions to artists. Mr. Faulkner's faint portraits of children on opal glass strengthened in sepia are more frankly wrought up by hand, and are charming vignette sketches so to speak. This operator is peculiarly happy in seizing—of course by instantaneous process—the characteristic attitudes and gestures of his little models. It is much easier to work by the instantaneous process on a small scale, and a tiny photograph may be enlarged to nearly any dimensions, as shown in some remarkable examples exhibited by the Autotype Company. The value of the process in the rendering of animals is illustrated in contributions by Mr. H. Dixon; and in sea-studies, with yachts in full sail, by Mr. P. Jennings—the latter of which have been awarded a medal. In the department of *genre* a medal has also been given to Mr. G. Nesbitt for an artistically-arranged group of a little girl fondling a dog with a "broken leg" enveloped in bandages. Another medal has been carried off by Mr. A. W. Wilson for one of an expressive series of figures illustrating Shakespeare's *Seven Ages of Man*. In landscape the exhibition is, as usual, very rich. Some views in Warwickshire, by Mr. Bedford, leave, it need hardly be said, nothing to desire. They are "not for competition," Mr. Bedford having been a member of the jury. To Mr. Vernon Heath a medal has been awarded for a series of landscapes; and there are many other admirable works in this section by Captain Abney, Messrs. H. Cooper, Pringle, &c. One of the surprises of the Exhibition is the excellence of the work turned out by the School of Military Engineering, Chatham, considering that the students can have little experience of the requirements of picturesque landscape photography. A view *Near Bettws-y-Coed* by the school has been justly awarded a medal, although there are few planes of distance to test the operator's delicacy of chemical manipulation and focal adjustment. Mr. England sends numerous illustrations of the buildings and courts of the Paris Universal Exhibition; and Mr. G. Berwick points to the applications of photography to scientific purposes in his "micro-photographs." Mr. Warnerke has lent a highly-interesting series of Russian and Swedish subjects, some of them taken in the Russian State establishments. The Woodbury Company (to whom a medal has been given) exhibit examples of its highly-ingenious process of reproduction in a series of "book illustrations," which present great fidelity to the originals from which they were taken. By the side of the printed impressions are the metal blocks from which they were taken; and a fresh wonder is awakened at seeing hard metal dug into as though it were by the burin, knowing all the while that these furrows are due to pressure of a mere photographic film. The sole drawback of the process—and it is only a commercial one, that is, perhaps, compensated for by other advantages—is that the printing is less direct than in the rapidly-improving processes of the "collotype," the French "photogravure," and the "autotype." A transparency of an interior taken by lamp or gaslight (of course, by means of a long exposure), exhibited by Mr. Bennett, is suggestive of the possibility of new applications of photography being found on the introduction of electrical lighting. A rule of the Society which forbids the introduction of photographs coloured by hand has not prevented some specimens of the so-called "Poikilographic process" of colouring, introduced by Lombardi and Co., from finding their way to the stairs leading to the Gallery. These are simply photographic transparencies on thin prepared paper or canvas, printed in colours on the reverse, so as to show through. Artistically considered, the process is almost valueless, though less objectionable than painting on the obverse, for the reason that the photograph is less obscured and falsified. It is also an advance on the "photochromie" of M. Vidal—that is to say, the application of variously-coloured films of gelatine—for the display of which a special pavilion has been provided in the Champ de Mars. But it is obviously not the slightest approach to photographing in colours: the photographers are as far off as ever from making Apollo a colourist as well as a draughtsman; and if they were to succeed, the result would be no more a work of art than the present photograph is so, and the sun-god would be no more an artist than he now is. In the section of apparatus a medal has been awarded to Cadett's patent pneumatic shutter, devised for rapidly closing the mouth of the camera. It is more portable than the electrical apparatus for the same purpose.

Recent Patents.

COLOURING PHOTOGRAPHS.

BY H. R. NEWTON.

The following specification describes some very complex methods of obtaining coloured effects in photography. The general principles involved are familiar:—

My invention consists in preparing albumenised, gelatinised, plain paper, or other photographs, or other illustrations, similarly coated or not, on one or both sides, or with fibrine or analogous or other substances, and all macerated materials—for example, from the thinnest tissue paper to the thickest cardboard—and all fibrous or woven substances or fabrics—for example, from the thinnest silk gauze to the thickest linen or calico—all either plain, coloured, or parti-coloured, or similarly coated, by removing all size, dressing, foreign, or other matter contained therein, by immersion in warm or cold solutions of chloride of lime, soda, benzole, volatile oils or essences, sulphuric, acetic, or other acids, as may be required from the particular manufacture of the various substances to be operated on, or from the quality of specially-prepared materials or fabrics, or other substances, and when cleansed in soft or other waters, immersing them by preference in a bath of warm Canada balsam in its natural state, or in other gums or resins dissolved in benzole, fixed, drying, volatile, or other oils, and, when saturation is complete, drawing them out between glass or other rollers or plates, removing thereby nearly all the excess of liquid with which the material or substance is saturated, and from which, when set, the remaining encrustation can be removed by benzole or by fixed, drying, volatile, or other oils, so that according to the transparency or semi-transparency required the natural or other surfaces may be left exposed, and when, according to the condition obtained, water, gum, transparent, body, powder, oil, varnish, printing, and other colours or pigments, or chalks, stains, or dyes, can be laid on to the front back, or on to similarly-prepared or oiled, plain, or coloured, or parti-coloured, macerated, or woven materials, in single thickness or layers, or other substances, or on, in front of, or between which they are to be mounted, such substances mainly being plain and tinted and coloured glass, opal, enamel, japan, vulcanite, china, earthenware, or gelatine, painted, varnished, and oiled papers and cardboards, and woven substances, or painted wood or ivory, the two latter of which, to prevent warping, are put together to any size in thin cross-pieces with bevelled lapping edges, and in as many thicknesses as the size requires.

My invention also consists in stretching such photographs or other illustrations on or between perforated metal or other frames, and mounting them on, or in front of, or between them, and fixing them on to similar or other naturally or artificially-coloured or tinted photographs or other illustrations, materials, or substances, as before described, and also for taking and printing photographs on paper, as before described, mounted on similar perforated metal, vulcanite, or other frames, and for using such perforated or other frames for forming thin folding albums fixed on continuous lengths of woven substances, ribbon, leather, parchment, paper, or other flexible materials, and for applying the method of mounting the photographs or other illustrations to metal and other lockets, or ornaments, or cases, designed to show, by double continuous rollers or revolving centres, one, two, or more photographs or other illustrations, and for the ready changing them with or without opening the metal or other ornamental enclosures or cases within which they are contained, the varying parts of all of which are applicable to other useful purposes; thus, for instance, the prepared papers and woven substances, and the metal of mounting, provide a new medium or ground capable of being toned as required for the better luminous production and preservation of pictures generally in oil, water, or other colours, and for drawing, tracing, and transparent uses.

In order that my said invention may be better understood and carried into effect, I proceed to describe the same more in detail.

The making all photographs and other illustrations transparent or semi-transparent by saturation as described is for the purpose of mounting them on various materials, plain or coloured, and on white and coloured linens and lawns, and raw and coloured silks and gauzes, and which have also been made transparent or semi-transparent, and prepared for mounting on a clear white ground, having first delicately covered with proper shades and tones in oil, water, body, or other colours, or stains, or dyes, the high or white lights, and any other small or other objects or parts to be coloured at discretion in photographs, &c., &c., the usually better, but not invariable, course being to colour out only very small parts or features, leaving the broader surfaces and features undisturbed; and this is done by putting either of the various ordinary kinds of colour, or materials, or liquids on the back or front of the photograph or illustrations where required, or else on the front of the prepared base; and by preference I use body colour with isinglass or size, the effect of which is, that the light transmitted upwards from the lowest ground has a blending effect and a translucency for all colours it can penetrate above it, and which is of the first importance for flesh colours, to avoid what is called "chalkiness" in appearance; and to obtain this by saturation as aforesaid, Canada balsam is employed by preference, though nearly all other gums and resins give a somewhat similar result, but lack a certain class of necessary purity and toughness, changing thereby the quality of the reflecting power. Oil is also used, and when in combination with Canada balsam and other gums or resins only sparingly, for a toughening action that is to destroy brittleness.

To prepare the various grounds or bases, a pure white gelatine, glazed paper (or any smooth-painted, or glazed, or enamelled material) is stretched on a frame, sizing it strongly on the back to prevent saturation. On this is mounted with Canada balsam any flesh-tinted or other silk gauze of whatever degree of tone necessary, and thin or thick, and in one or more layers as required. Over that again is mounted in a similar way linen or lawn of whatever coarseness or fineness required, and in one or more layers, and this forms the flesh base in portraiture and the ground base in general subjects.

To form the upper coloured base, a tracing on stiffish gelatine is made of the principal lines of the subject, and the lines marked on the gelatine are then cut through as in stencil plates. As many coloured squares of paper (thick or thin) or squares of silk, according to judgment, are then taken as the intended colouring of the photograph or illustration necessitates, and, when required for flesh subjects, one additional layer of white linen. The gelatine stencil plate is then put over all these squares of paper and pressed down firmly, and while so held the different thicknesses of the coloured or other paper or materials are cut through, the cut in the lines of the stencil plate guiding the cutting point, so that all thicknesses are correspondingly cut at one operation. One of each of these is then mounted on the flesh or ground base, covering it over entirely, and then (the small parts being coloured out, and which is best done when mounted on metal frames or mounts) the photographs or illustrations are mounted in the same manner on the prepared bases or grounds; ordinary bookbinders' cloth is then mounted on the back, the edges turned over on to the front, and hermetically sealed down, as it were, varnishing over afterwards.

There are different and various ways of approaching somewhat towards the same result, among them the lower prepared base could be printed in colours in the ordinary way; but the risk of inaccuracy in shrinking, printing, and otherwise, in high-class works and delicate subjects would probably interfere with its general application, besides which there is always a loss of translucency in dealing with opaque colours.

In colouring by hand the photograph, &c., on the prepared base the foregoing difficulties do not exist, though there is greater care required in getting evenness of tone, tint, and colouring.

The foregoing system, though referred to specially for portraiture, as flesh colours and tones are the most difficult to obtain and the most important to achieve, is applicable to any class of subject in any photograph or illustration. All the different substances mentioned, as well as others, form in a greater or less degree materials to operate on to produce the foregoing results, especially ivory, but the grain and the non-absorbent properties, and perhaps the opacity of that material, seem to prevent it returning that depth of reflection which can other ways be obtained, and which is essentially necessary, so as to take off the ordinary hardness of features and outlines that are in a greater or lesser degree characteristic of photographs and other illustrations.

Somewhat similar effects to those hereinbefore described can be obtained by the insertion between the photograph or illustration so prepared and the coloured and toned base underneath of a metal, card, or other frame, so that the representation is lifted up from the surface of the base, and a blending and softening effect is obtained irrespective of the materials of which the base is composed; but more powerful and violent colours have to be used, and more care taken in treatment, though the base can be coarsely and roughly formed, as the absence of impact with the lower layer ceases to require delicacy of adjustment, and, where it is possible to obtain excessively thin patent plate glass, it is best to mount the photograph, &c., between two pieces, and then mount the coloured base on the lower glass, finishing with a cloth back and turning over the edges as previously described.

The different and various materials employed can be either highly polished or else have a ground surface, according to whether the effect is desired to be bright and sparkling or subdued, and the greater the care and the greater the evenness of the materials used the more more perfect will be the effect in general, and in treating photographs or illustrations so prepared transparencies by placing daylight or artificial light behind them.

In preparing paper for photographs (the printing and taking of which is chemically performed in the ordinary way) I find that better results than ordinary are obtained by mounting the paper first on vulcanite or similar classes of frames before coating it or sensitising it, the more so as very much thinner paper can be employed than is ordinarily used; the impact with the negative seems more complete and even, and the positive, therefore, relatively better printed, besides which the sensitised surface is kept more flat; while drying no creasing takes place, and the whole of the operations of manipulation can also be more easily carried out, and, what is perhaps more important, without the photograph or illustration being touched by the hand.

For the better preserving and exhibiting photographs, &c., so treated (and whether in the first instance mounted on perforated metal frames or not) all mounting frames have perforated edges, so as to be able to sew them round those sides on ribbon (or other endless material) back and front, leaving the bottom ends open until the illustration has been inserted; the whole can then fold up (being fastened continuously) very closely, and in a similar way to an ordinary album, and with a separate or fixed case attached thereto. In the same way photographs, &c., &c., mounted without frames on continuous lengths of materials are wound round double rollers, large or small, and inserted in wooden cases or frames for standing on tables or otherwise, so that with handles to the ends or centres of rollers they can be turned round, forwards, or backwards without opening the case, and which arrangement in miniature is carried out for lockets or other ornaments, so as to have a number of portraits or illustrations within one enclosure, and changable with or without opening the frame, case, locket, bracelet, or other article.

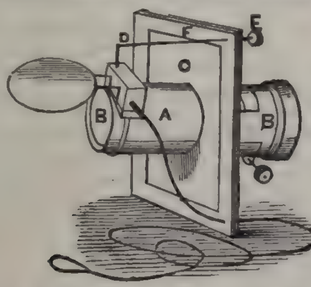
Having now particularly described and ascertained the nature of my said invention, and how the same can be carried into operation, I would have it understood that what I desire to secure under the hereinbefore letters patent are the several modes and methods and appliances herein mentioned for dealing each in their degree with the treatment of photographs and all other illustrations, and that I claim the uses of all or any of them in that or other ways, and the application of silks and gauzes, linens and lawns, plain or coloured, prepared transparent or otherwise, using them according to size or otherwise in a greater or lesser degree of coarseness or fineness, and that I do not bind or limit myself by the recited particulars and explanations against the free use of the liquefying or other agents, or of colours of whatsoever sort besides coloured materials, as in all works of art the effect of blending or contrast in colour is obtained by placing colours of different qualities in juxtaposition by different means, methods, and applications, according to ever-varying circumstances, combinations, and natural conditions.

◆

CADETT'S PATENT PNEUMATIC PHOTOGRAPHIC SHUTTER.

BY. W. BARRY.

I presume that most of the photographic profession are using the above shutter to their cameras, and have little doubt but that they have found out ere this its weak point, viz., its being visible to the sitter, and thus causing them, when it is unexpectedly raised by an unseen power, and being a novelty also to them, to cast their eyes round to it, and especially children, who generally keep their eyes on it, expecting it to move again; and as we do not always want them looking straight to the front, we have devised the following scheme, so as to fix the shutter inside the camera, and so out of sight; thus the exposure can be made quite unobserved by the sitter. I can recommend it to all who have room inside their cameras to admit the shutter. In most double or C.D.V. or cabinet cameras there is just room—ours being of this description. Below is a sketch of the inside of the camera-front, with the shutter attached as we use it.



A is a tin tube blacked, whose diameter is a quarter of an inch larger than the outside of the back tube of the lens, BB, to be used so that the lens will move freely in it when moved by the action of the focussing screw. Length equivalent to the amount of lens tube inside the camera, when the lens is screwed or focussed right in. C is a tin plate on which the tube is soldered, which is screwed to the inside of the camera front, leaving the sliding front free. On this tin tube the pneumatic shutter is fastened by the supplied means of the elastic band. It need not be fair on the top (as it always appears in the wood-cuts), but to one side, if needed, as ours is, or even at the bottom; in fact, anywhere where there is most room for it; also so as to bring the catch lever to fix the shutter up in a line with the most convenient place for the hole for the wire and button hereafter mentioned. The elastic tube to the air-ball passes through a tight-fitting hole (to prevent ingress of light) in front of the camera, and close to the bottom, so as to keep clear of the sliding front. The catch lever, to keep the shutter up when focussing, is fitted with a brass wire, D, terminating in a button, E, outside the front of the camera, through tight-fitting hole, care also being taken to keep it clear off the sliding-front. In the sketch it is shown as in our camera, viz., in the top right-hand corner, also the hole for tube in the bottom right-hand corner. There is a shoulder or rim, F, on the wire inside the camera, the distance between the shoulder and the button just leaving sufficient movement backward and forward for the release and catch of the shutter, about half-an-inch. It is obvious that the entire arrangement leaves the lens, BB, free to be moved (or focussed) backward and forward to each extreme inside the tin tube, without carrying the shutter with it, or in any way interfering with it. The lens can even be screwed out of the flange, the sliding-front removed and replaced by another front and lens, without disturbing the shutter at all; also, it in no way interferes with the shortening or lengthening of the camera.

We have found the plan to answer well, particularly with children or animals (the latter are sure to turn their heads to look at the shutter when it moves, if it is fixed outside); and if any of my photographic brethren feel disposed to give it a trial, I have no doubt they will be equally pleased with it.

I may add that we had to take the bellows arrangement out of its case, but it is easily done, and in no way detrimental to it; it is also protected from injury by its being inside the camera.

◆

AMBER VARNISH.

An improved method of preparing amber varnish has yielded results so excellent that the discoverer has obtained letters patent for it. Mr. S. Meredith, of Edgbaston, says that the varnish he produces is capable of giving a very superior polish or surface, and is especially valuable for coach and other high-class work. In carrying out his process he first bleaches the amber by placing a quantity—about, say, 7lb.—of yellow amber in a suitable receptacle, such as an earthen crucible, of sufficient strength, adding 14lb. of sal-gemmæ (rock or fossil salt), and then pouring in as much spring water as will dissolve the sal-gemmæ. When the latter is dissolved more water is added, and the crucible is stood over a fire until the colour of the amber is changed to a perfect white. The bleached amber is then placed in an iron pot and heated over a common fire until it is completely dissolved, after which the melting-pot is removed from the fire, and when sufficiently cool the amber is removed from the pot and immersed in spring water to eliminate the sal-gemmæ, after which the amber is put back into the pot, and is again heated over the fire until the amber is dissolved. When the operation is finished, the amber is removed from the pot and spread out upon a clean marble slab to dry, until all the water has evaporated, and is afterwards exposed to a gentle heat to entirely deprive it of humidity. To make a varnish, white amber prepared as above described is reduced to powder in a mortar, or otherwise, and is melted over a fire in a clean iron pot, and as much fine nut oil as will make it into a varnish is then added, after which the whole is well stirred until thoroughly mixed. The pot is then removed from the fire, and when the heat has sufficiently moderated, essence of turpentine is added to form a composition of the proper consistency for use. The following proportions answer well, but the patentee does not limit himself thereto:—White amber, 1lb; essence of turpentine, 2lb; fine nut oil, 1lb. Such a varnish, if really superior to the present amber varnish, will be of great value form any purposes.—*English Mechanic.*

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THE PHOTOGRAPHIC EXHIBITION.

VI.

ONE of the most prominent features of all the recent exhibitions of photographs has been the number and excellence of the enlargements. The Exhibition now open in Pall Mall is scarcely so much over-weighted by this element as have been some of late years; but there is no lack of very perfect examples of enlargement. Prominently meeting the eye in the centre of the further end wall of the gallery is a portrait enlarged by the Autotype Company from a negative by Messrs. Downey, of a lady whose portraits have attracted much attention during the past year. Two portraits of Mrs. Langtry, painted by two distinguished painters, appeared in the Royal Academy exhibition last May. The lady herself is said to have been the pet beauty of society during the last season. Notwithstanding that her special claims to beauty rest chiefly on the rich and glowing colour of her complexion eyes, and hair, the lady has been photographed very repeatedly, and her published portrait, although disappointing, is the cynosure of all eyes in the shop windows. The enlargement in question is a pleasing portrait, and an admirable photograph, delicate, forcible, and singularly well modelled. It is a three-quarter standing figure, the head facing round, looking backwards. The somewhat décolleté shoulders are rendered in mezzotint and are singularly full of gradation and modelling, the darkest shadows in the picture being unusually transparent.

Probably the best enlargements in the Exhibition are those, by Mr. Henry Dixon, of wild animals (No. 111). Prints from the original negative also appear: these are very minute, less than *carte* size, dull, and apparently under-exposed. We apprehend, indeed, that their exposure must have been instantaneous, and great judgment has been shown in not bringing them up to ordinary printing intensity, and so spoiling them for enlarging purposes. The enlarged pictures, printed in carbon, are perfect, and, beyond a question, the finest photographs of wild animals ever exhibited. In this case the original negatives and the enlargement are the work of the same artist. We cannot help adding here, that, without assuming wisdom superior to that of the combined jurymen, this is a case where a medal might with great propriety have been awarded.

It is not necessary or desirable to notice in detail every enlargement exhibited, as many of them are of the same type and of the same quality of excellence which have been exhibited in former years. The Autotype Company exhibit several very fine portrait enlargements, and some fine landscape enlargements; and Mr. V. Heath exhibits fine landscapes enlarged by the same Company. The Woodbury Company exhibit also enlarged portraits of the highest excellence, as the likenesses of Mr. H. G. Byron, Mr. Henry Irving, and others attest. Messrs. Marsh, Brothers, exhibit several excellent enlargements, original negatives and enlargement both produced by themselves. This distinction becomes essentially necessary at a time when enlargement is to a great extent effected, and that admirably, for the profession by firms in London. No. 26, a study of Ferns and Bluebells, by this firm, is an unusually fine enlarged picture.

An enlargement of a horse belonging to Baron Rothschild, "Prince" (No. 7), by Mr. Henry Dixon, is noteworthy, not merely for excellence, but for the fact that it is an example of double printing in carbon by the double transfer process. The proper junction of the image from two negatives in such a case can only be done by registration; as, in carbon printing, the sight affords no assistance. The reason for the double printing is simple: the horse required to be held by his groom in standing for his portrait, and it was desired that the finished picture should present the horse alone without the groom. A second negative was, therefore, taken of the necesssary portion of background, and, the groom masked out, the proper portion of background was printed in, making the picture complete.

A fine study entitled "Resignation," an enlargement, is exhibited by Mr. A. Brothers. The general effect seems to be excellent; but it is so sadly skyed, that unless an opera glass be employed to aid in examining it, no idea of the detail can be obtained. Two examples of Harman's mode of enlargements (310 and 311) are very good, and well worthy of examination.

We hope to take leave of the Exhibition next week in a few words on the landscapes, which it will scarcely be necessary to notice in detail, as all are good. A few words will also be necessary on the transparencies and on the apparatus. We may remark here that, whilst we still feel that this Exhibition is inferior to the average of the last few years, a closer examination in detail gives us a better impression of the general excellence of the contributions.

◆

THE EXTRA RAPID WET PROCESS.

EXTREME rapidity of exposure has always possessed a rare fascination for photographers. Nicephore Niepce, writing to Daguerre, marvels, with something of good, natured envy, at the exceeding quickness with which his results are produced. It was the rapidity of collodion which excited the most interest when the discovery of the process was announced. The introduction of Boissonas' process into America, as the "lightning" process, has created an extraordinary interest: the greatest enthusiasm prevailing amongst the successful, amongst those who have acquired the process, and much bitterness amongst those to whom the process is "sour grapes," or those unwilling to patronize "process mongers." Rival rapid processes have sprung up in the States, and on the Continent, and in this country. We have heard of some who profess to beat on his own ground M. Klary, who undertook to *exploiter* Boissonas process in France and elsewhere. But we should, of course, like to hear the lion's version of the encounter. Whether England is an unlikely field for M. Klary's enterprise, or he has other engagements, we cannot tell; but it is rumoured that his projected visit to England to vend the process is abandoned. We feel the less compunction, therefore, in publishing the details of the process, which have come into our hands. As a rule, we do not like to interfere with any legitimate enterprize, and should feel it unfair, by analysis or by inducing any one to violate confidence, to obtain for publication secrets which an inventor or discover might wish to preserve intact. The alleged process has been sent to us, however, for publication by a correspondent in Paris. And whilst we should not have sought to trench upon M. Boissonas' secret, we do not feel at liberty to withhold from our readers any details sent for publication which may interest or instruct them.

Here is the letter of our correspondent containing the details, and all our readers may test for themselves the rapidity of the process, and estimate the *bona fides* of the communication:—

"Dear Sir,—Should you find it interesting for your readers to publish the *extra-rapid* process of M. Boissonas, about which so much noise has been heard lately, I beg to send you the exact formulas employed by him; every photographer will be thus enabled to judge by himself of the regular rapidity of the process.

"The most important part consists in the addition of acetate of copper in the developer, which is composed as follows:—

Distilled water	1000 parts
Sulphate of iron	60 „
Acetate of copper in solution of 10 per cent.	20 „
Glacial acetic acid	50 „
Alcohol	50 „
Pure honey	12 „

"The silver bath must be quite neutral. The collodion is as follows:—

Sulphuric ether...	500 parts
Alcohol	500 „
Pyroxyline	7 „
Iodide of cadmium	3 „
„ ammonium	3 „
„ zinc	1 part
Bromide of ammonium	6 parts

"*Paris, 5th November*, 1878."

We shall be pleased to hear reports of results.

◆

INVESTIGATION OF PYROXYLINE.

We published, a few weeks ago, an appeal from Dr. Eder, to whose researches in photographic chemistry photographers are much indebted, asking photographers and chemists to aid him by stating their experience in regard to pyroxyline made by various formulæ (see page 487, October 11th). Dr. Eder is preparing a work on the subject, and wishes it to be as exhaustive as possible. Dr. Eder asks us to enforce his request by our influence, and adds that he will give full prominence in his forthcoming work to the names of any who kindly favour him with their experiences on the manufacture, use, and keeping of pyroxyline.

◆

A GOOD MOUNTING MATERIAL.

One of the great wants in photography is a good mounting material. Flour and starch pastes turn sour, so also does gum; glue requires heat, and is not always easy to manipulate; and all these cause the mounting-board to buckle. A correspondent sends us recipe of a very promising improvement upon the ordinary materials in use, and a sample of the result of the recipe carries out all the promise. He says:—

"Dear Sir,—Having seen enquiries in the Photographic News about mounting materials, I have sent you a sample of a mountant that suits me well; and I don't remember having seen it in the News, although I got the idea from that source. I like it better than gelatine, because it does not require warming before use, nor set when spread over large print before it can be rubbed down:

Water	1 ounce
Methylated spirit	2 ounces
Dextrine	2 table-spoonfuls

Mix the water and spirit; stir in the dextrine, making a smooth paste, and place the vessel you mix it in in hot water till a clear brown solution results.—Yours respectfully, "Trywell."

"*Hawkhurst, November 5th.*"

ELECTRIC LIGHTING IN THE BRITISH MUSEUM.

BY PHOTOPHILUS.

The almost daily inventions or improvements connected with the electric light warrant us in believing that the labours of the numerous scientific men who are devoting their attention to the subject will at no distant time result in its wide and practical application.

We may point out one use of the electric light which would be well worth the outlay on its employment. We believe its use in the British Museum Reading Room is both practicable and desirable. The Trustees of the Museum have hitherto liberally made that great establishment as accessible to the public as has been compatible with the due security of the inestimable treasures which the nation confides to their keeping. Throughout the year, except on Sundays, the reading room is opened as long as daylight will permit, and for a far greater number of hours than most of the great European libraries. The danger of fire accompanying the systems of artificial lighting hitherto in use, and the injurious effects of the combustion of gas or oil upon the books, have, up to the present time, deterred the administrations of most grea libraries from opening them at night. The public libraries of St. Petersburg, Madrid, and Turin, however, have been for some time lighted in the evening.

Now that there is a prospect of an efficient light free from these serious objections, we may hope to see the use of our great reading room extended in a way that will benefit many who cannot avail themselves of its resources during the daytime, for it can scarcely be doubted that the Treasury would authorize the slight expenditure which this useful measure would involve.

The electric light, as is well known, has been effectively used in several railway stations in Paris, and in many large factories, notably in that of Messrs. Siemmen's in this country. It is in use in the *Times* printing office, and is now being introduced into the workshops in Woolwich Arsenal. The public has had an opportunity of judging one kind of electric lamp outside the Gaiety Theatre, and the Avenue de l'Opera, in Paris, has for months past been illuminated in the same way. It is evident, however, that as yet there is no agreement as to what is the best kind of electric lamp, although the Gramme machine seems to be generally recognized as the most economical and efficient dynamo-electric apparatus for the generation of the electric current. Those who consider only the superiority of the electric are over other sources of artificial light may be sanguine as to its ultimate substitution for gas in the illumination of large areas. Certain practical difficulties, however, still as real as ever have yet to be overcome before their anticipations can be realized, and this will not be done in a day, but will be a gradual result of independent scientific investigations carried on in the same direction. The sub-division and conveyance of the electric current must be improved, and a more economical lamp devised, before the new light can supplant gas in our streets. These considerations, however, scarcely affect the feasibility of its employment in such a comparatively limited space as the reading room of the British Museum, where the result would be, beyond all dispute, great in proportion to the outlay, and where economy would not be so much a desideratum as immunity from risk of fire, from vitiation of the air, and from injury to the books.

The chief requisite for library use is a calm and steady light. Most of the lamps yet in use are by no means free from much flickering, which even the large opal glass globes cannot entirely disguise. This unsteadiness in the light is very injurious to the eyes, and is so serious an inconvenience as to preclude its use in a library. We may hope that a remedy will soon be found for this defect. Mr. Werderman seems to have gone furthest in this direction. His lamp is simple, and simplicity is perhaps a recommendation.

The negative pole is formed by a disc of carbon, and the positive pole by a rod of carbon of much slighter dimensions. Owing to the difference in size between the two carbons, it is found that the combustion is practically confined to the positive pole, which is constantly maintained in proximity with the negative disc by a pulley and weights, and a steady light is secured.

The great advantage of the electric light need scarcely be pointed out where art or other studies are concerned which involve the true appreciation of colours possible only in white light.

The vast rotunda of the reading room itself would seem well adapted to the employment of the electric light, whether a very powerful central lamp were used, or whether five or six lamps were disposed round the circumference at about the height of the upper balcony (sixteen feet). The ceiling of the dome would reverberate much of the light upon the tables, and this effect would be increased considerably if it were repainted in lighter tints, which in the atmosphere of London would at no time of the year be found too bright.

Whatever may be said of the feasibility of establishing the electric light in the printing room, the same certainly has no application to the numerous galleries in which the greater portion of the library is housed. The illumination of these would be not only costly, but very difficult, if not wholly impracticable. It might, indeed, be possible to conduct the internal library service by the aid of lanterns, which even now are occasionally called into requisition whenever there is a heavy fog. To maintain an evening service, however, as complete as that engaged during daytime, would require a double staff of attendants, and necessitate a considerable increase of expense, which, perhaps, the Treasury would be at first reluctant to sanction. But it should be remembered that the reading-room alone contains about 80,000 volumes, a third of which number, including many of the best works of reference, is at the disposal of readers who themselves are at liberty to take the volumes down from their places. There might, perhaps, also be some arrangement by which books wanted for evening use could be fetched from the general library during the day, and kept in temporary places in the reading-room under charge of attendants, just as books are now kept from day to day for regular frequenters of the room.

It would be necessary to isolate the reading room from the rest of the Museum. This could easily be done by a series of high movable barriers, which could be set in their place and connected at the usual hour of closing, so as to form a straight passage leading directly from the main entrance to the reading room. The small motive power necessary to drive a Gramme machine would be obtained with very little extra expense. There is already a steam engine constantly at work on the premises to turn the ventilating fan, from which one or two horsepower could probably be spared to keep a Gramme machine at work. Or if a separate steam engine were necessary, the steam could be supplied from the boilers used to heat the building, and which already furnish the fan-engine with steam.

Altogether, the reading room of the British Museum seems to be one of those edifices in which the electric light may most easily and advantageously be used; and if a steadily burning lamp can be obtained, we hope the trustees of the Museum will undertake some experiments with a view to its employment in the great Bloomsbury dome. The advantage of extending the intellectual benefits and privileges of the national library cannot be too widely appreciated, and should need no advocacy.

Correspondence.

PORTRAITS BY ARTIFICIAL LIGHT.

Dear Sir,—In your notice, in the last number of the News, of our pictures taken by artificial light, there is a slight error we should be glad to correct. You mention a lamp of special construction which is patented. Our patent is not for the lamp, but for the apparatus for rendering any kind of actinic artificial light available for portraiture.—We remain, yours obediently, **Alder and Clarke.**

36, *Strand.*

Proceedings of Societies.

Photographic Society of Great Britain.

The first meeting of the session was held in the Water Colou Gallery on the evening of Tuesday, the 12th inst., Mr. J Glaisher, F.R.S., in the chair.

The minutes having been read and confirmed, the following gentlemen were ballotted for, and duly elected into the Society: Messrs. C. Bennett, J. E. Bliss, T. J. Dixon, F. Downer, J. G. Hemery, W. Perry, A. Lombardi, J. G. Ritchie, G. Small, W. Vanner, S. W. White, and S. Wolstenholme.

The President then proceeded to distribute the medals awarded by the jury for excellence in contributions to the exhibition, adding a few appropriate words in each instance. The medallists were Mr. Vernon Heath, the School of Military Engineering, Chatham, Mr. A. W. Wilson, Mr. G. Nesbitt, the Woodbury Company, Mr. Payne Jennings, Marion and Co. (for Mr. Cadett).

The President then proceeded to commend as worthy of great admiration the contributions of Mr. C. Bennett, Mr. H. Dixon, and Mr. W. Bedford; and also to thank Mr. Warnerke very heartily for his valuable loan collection.

The Hon. Secretary then read a paper by Mr. Warnerke giving interesting details of his observations of photography in Russia during a recent visit.

Mr. J. Thompson then gave some details of his photographic experiences in Cyprus. After votes of thanks, the Chairman called attention to an enlargement by Mr. Cadett. It was produced on carbon tissue by an exposure of fifteen minutes to an electric light equal to 5,000 candles.

The proceedings then terminated.

South London Photographic Society.

The usual meeting was held in the Lecture Hall of the Society of Arts on the evening of Thursday, the 7th inst., the Rev F. F. Statham in the chair.

The minutes of a former meeting having been read and confirmed, Mr. C. Bennell Cutchie and Mr. H. Garrett Cocking were elected members of the Society.

The nomination of officers to be elected at the annual meeting in December was then made, after which Mr. F. A. Bridge read a paper describing an unusual case of fogging in developing an enlargemennt on paper. The paper was the usually iodized paper, developed with gallic acid; the exposure to artificial light. Usually he had no trouble; but on this occasion the moment the developer was applied the paper turned purple all over, finally becoming quite black. Everything was the same as generally employed, except the acetic acid, which was a fresh bottle; and on trying a fresh sample of acid, all went right again (see page 542).

A desultory conversation on the subject followed, in which cases of fogging in negatives were traced to impure acetic acid. The presence of iron of sulphuric acid and aldehyde, and other possible contaminations of acetic acid, were suggested, but no definite conclusion was attained.

The discussion on some points of Mr. Dunmore's paper at the previous meeting was resumed in a desultory conversational manner. On the question of blisters in albumenized prints,

Mr. Brooks expressed a conviction that the use of a strong silver bath, with weakly salted paper, was a perpetual cause.

Mr. Foxlee reiterated his conviction that the original paper was the primary cause of blisters.

Mr. Ayres said that adding one ounce of methylated spirits to each seven ounces of water in making the silver bath would prevent blisters.

Several members discussed the question whether blisters, whe dry, left stains, no general agreement being arrived at. The varying quality of water was suggested as accounting for varied experience.

After further desultory conversation the proceedings terminated.

Photographers' Benevolent Association.

On Wednesday evening, November 6th, the Exhibition at Pall Mall was open, by kind permission of the Photographic Society of Great Britain, in aid of the Photographers' Benevolent Association, and attended with satisfactory results. During the evening the Gallery was visited by the President (James Glaisher, Esq.) and other eminent gentlemen connected with the profession.

On the same evening the Board of Management considered an application for relief, and granted the assistance required by the applicant.

Edinburgh Photographic Society.

The Nineteenth Annual General Meeting of this Society was held in 5, St. Andrew's Square, on the evening of Wednesday, 6th Nov., **John Lessels**, Esq., in the chair.

The following new members were admitted:—Mr. George Turnbull, Mr. Marshall Wane, and Mr. James Meek.

Mr. **Pillans**, the Honorary Secretary, then read the following report, which was adopted:—

"The Council, in presenting the nineteenth annual report, have pleasure in congratulating the members on the large accession to the membership, and the increased popularity of the Society.

"During the past year the Society has lost sixteen members by deaths, resignations, and removals, and sixty-six names have been added to the roll of membership; the Society now numbers a total of three hundred and forty-three.

"Sixteen meetings have been held during the past session, nine of which were ordinary, three out-door, two popular, one special, and the annual excursion.

"The meetings have been well attended, and an increasing interest has been displayed by the members generally in the subjects brought under consideration.

"The popular meetings have been largely taken advantage of by the members and their friends, and continue to be one of the interesting features of the Society's operations.

"The Council regret that the out-door meetings have not been so well attended as they deserve to be, and they hope that in future this interesting and instructive branch of the Society work may be more largely taken advantage of. During the past session visits have been paid to North Queensferry, North Berwick, and Bridge of Earn.

"A special meeting was held on the 16th November, 1877, for the practical demonstration of the working of Keevil's patent lantern, sent by Mr. York, of London, to whom the Society has been largely indebted for the loan of transparencies.

"The Annual Excursion was pre-eminently successful: a company of over one hundred spent a most enjoyable day at Winton Castle, the beautiful grounds surrounding that fine old historical mansion having been thrown open by the special favour of Lady Ruthven.

"The papers read before the Society have been chiefly noticeable for their practical character. The following is a list of subjects:—'The Comparative Merits of the Different Dry Plate Processes Exemplified from the Studies of Several Amateur Members of the Society,' by Mr. Norman Macbeth, A.R.S.A.; 'The Progressive Results of the Past Session,' by Dr. Nicol; 'On Some Properties of Glass,' by Mr. Wm. Gilmour; 'Transparencies,' by Mr. W. T. Bashford; 'Remarks on Landscape Work, and its Relation to Art,' by Mr. Payne Jennings; 'The Collodio-Bromide Emulsion Process, with Practical Experiments,' by Mr. Alex. Mathison; 'A Resumé of the Gelatine Process,' by the Rev. J. H. Palmer, M.A.; 'A Month Amongst American Photographers,' by Dr. Nicol.

"The thanks of the Society are due to the following gentlemen:—Messrs. Macbeth, Mathison, Murray, and Jennings, for exhibiting selections from their works; the Rev. J. H. Palmer, M.A., of Birkenhead, for samples of his gelatine plates and transferred films, and also for his portable dark slides; to Mr. W. H. Davies for exhibiting a photogravure plate, and likewise delivering the lecture on the second popular meeting; to Mr. Bashford for transparencies; to Mr. McKean for exhibiting his portable camera and tent; and to Mr. G. W. Wilson, of Aberdeen, for his presentation of an Archer's fluid lens.

"As a special feature in the transactions of the past year, your Council would refer to the handsome presentation print of a picture by Sir Noel Paton, who kindly permitted it to be reproduced in carbon by Messrs. Doig, M'Kechnie, and Davies, exclusively for the use of the Society.

"In conclusion, it will be seen from the Treasurer's report that the financial position of the Society contrasts favourably with any past period of its history."

Mr. **Alexander Mathison**, Treasurer, then read his report previously drawing attention to the fact that the funds of the Society are locked up in the City of Glasgow Bank, but that in consequence of an arrangement come to by the other banks for the relief of depositors, one-half was rendered available, and the Royal Bank of Scotland had given credit to that amount.

The following is a summary of the Treasurer's intromissions, which had been certified correct by the Auditor, Alexander Niven, Esq., C.A.

To Balance in hands of Treasurer, and arrears from last year...	£57 0 1
Subscriptions from Members on list at commencement of year, 308 at 5s.	77 10 0
Subscriptions from New Members, 70 at 5s.	17 10 0
Subscription from one Life Member	3 3 0
Balance of Proceeds of Sale of Photographs...	4 6 7
Interest on Bank Account	1 13 4
Total	£161 3 0

by Rent of Room...		£3 7 0
,, Presentation Prints		37 10 0
,, Expenses incurred at two Popular Meetings:—		
Lecture Fee	£2 12 6	
Rent of Hall	6 0 0	
Oxygen and Loan of Bags	1 0 0	
Fitting up Screen...	1 1 0	
Miscellaneous	1 0 2	
		11 13 8
,, Printing Billets		9 3 6
,, Postages of ditto, Stationery, Carriages, &c.		10 0 6
,, Fees for Secretary's Clerk, &c.		6 5 0
,, Arrears of Subscriptions written off		5 5 0
,, An Advertisement		0 6 0
,, Subscriptions in arrears, 1876-7-8...		6 0 0
,, Balance due by Treasurer:—		
Amount in Deposit Receipt with City of Glasgow Bank, including Interest	£61 7 5	
On Account current ditto	55 5 11	
	£116 13 4	
Deduct one half thereof, which credit meantime obtained with the Royal Bank of Scotland	58 6 8	
	£58 6 8	
Balance on Account current with Royal Bank of Scotland, per Pass Book	10 11 2	
In hands of Treasurer	2 14 6	
		71 12 4
Total		£161 3 0

This report was adopted, and the meeting then proceeded to the election of office-bearers for the coming year, when the following gentlemen were unanimously chosen:—

President.—John Lessels, Esq.

Vice-Presidents.—Dr. J. A. Sidey and Lieut.-Col. Herne.

Hon. Secretary.—Malcolm G. Dobbie, 320, Leith Walk, Edinburgh.

Treasurer.—Alexander Mathison.

Corresponding Secretary.—William T. Bashford, Portobello.
Lecturer.—W. H. Davies.
Auditor.—A. T. Niven, Esq., C.A.

Councillors to supply the places of those retiring:—William Forgan, Robert Murray, C.E., Duncan Anderson, Hugh H. Pillans, and James Dickson.

The only alteration of note is that of "lecturer." It was agreed that this officer should henceforward have a seat at the council-board, and that no fee be attached to the office.

The usual votes of thanks having been passed, the meeting terminated.

W. E. Bashford, Cor. Sec.

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held on Thursday evening, the 31st ult., at the Free Public Library, William Brown Street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and passed, and Mr. W. D. Meade was elected a member of the Association

Mr. J. A. Forrest exhibited some fine photographs of lake scenery, and Mr. Potter and Mr. Clarke showed a number of capital pictures taken during the summer.

The Secretary called attention to two prints from the same negative by Mr. W. E. Potter. One print was from a negative before it had been improved; the other from the negative after it had been varnished on the wrong side with matt varnish and then painted with a wash of yellow water-colour over the heavy shadows. foreground, &c. By these simple means a result had been obtained which made a decidedly more artistic and beautiful picture.

Mr. W. H. Kirkby read a short paper "On Recovering Waste Silver in Printing" (see page 542), and the Rev. H. J. Palmer one on "A New Cure for Blurring" (see page 512). Several negatives illustrating the latter paper were handed round, but it was thought that the cure was not an absolute one.

The Secretary exhibited some prints and a negative to show the qualities of the "Waverley" plates.

The Rev. H. J. Palmer showed some prints from Swan's plates, which indicated the advance that had been made in dry plates in being able readily to secure pictures including children and animals. Mr. Palmer also showed some capital transparencies from Swan's plates developed with the ferrous oxalate developer, and recommended it highly. He had used the developer over and over again for at least fifty negatives during the past six weeks, only once restoring its vigour by boiling down. It worked then as good as ever, being kept in order by adding pieces of iron wire to the solution.

It was announced that the Association would take part in the intended associated *soiree*, to be held before the close of the year in St. George's Hall.

Mr. L. W. Weber exhibited the Chadwick oxygen generator, and illuminated by it the sciopticon. The Rev. H. J. Palmer also showed by its aid a large number of transparencies which he had mentioned in his late paper on "Switzerland from a Photographic Point of View."

After hearty votes of thanks to the Rev. Mr. Palmer and Mr. Weber, the meeting was adjourned.

Photographic Society of Berlin.

The first meeting of the winter session was held on the 19th of September, under the presidency of Herr C. Brasch.

After the admission of a large number of new members,

The Chairman drew the attention of the Society to the proposed memorial of Nicephore Niepce that it was intended to erect in France.

Herr T. Joop enlarged on the services rendered by Niepce to photography, and exhorted the members to participate in the international subscription that was being raised in behalf of the project.

Cadett's pneumatic shutter was introduced to the notice of the meeting by Herr F. A. Benckendorff, and met with unanimous approval.

Herr Duby laid before the meeting a number of landscape photographs taken by himself on Wilde's dry plates, upon which a lively discussion arose on the advantages and disadvantages of dry plate photography.

The next meeting was held on the 3rd of October, when Herr C. Brasch, the President of the Society, again occupied the chair.

Herr E. Duby read a paper, illustrated by experiments, on "Positives, their Different Methods of Preparation, and their Importance in the Enlarging Process." He commenced by pointing out that positives taken on white of egg, and developed with gallic acid, are very delicate in outline, but are at the present day not much employed. Positives obtained by the wet process are brilliant, vigorous, and well adapted for producing enlargements; and also those taken on dry plates with Wilde's emulsion are not inferior to the ones taken in the wet way as regards vigour and richness of detail, which they surpass, than in respect of the ease and rapidity with which they can be produced. The lecturer here illustrated his remarks by taking a positive on one of Wilde's dry plates, exposing it for a minute and a half under a negative by the light of a petroleum lamp, and then developing before his audience. This method, on account of its simplicity, certainty, and the excellence of its results, meets with universal approval. For obtaining positives by the wet process, the lecturer recommended the small apparatus of Bock, which had already been submitted to the notice of the Society. He then went on to speak of positives obtained by the carbon process, and expressed an opinion that, brilliant as they are when obtained by this method, and well adapted for window ornamentation, yet as objects for enlarging from they are practically useless. The cause of this lies partly in the relief of the gelatine film, which in the enlargement is reproduced incorrectly with widened contours, and partly in the circumstance that the enlarged carbon film always has an exceedingly impure, jagged, and unequal appearance. The lecturer had attempted to remove the first of these defects by developing the positive paper first of all on caoutchouc paper, and then by a double transfer, transferring it to a glass plate coated with gelatine that had been hardened by chrome-alum. By this means the relief was entirely removed; but the second above-mentioned defect, that of the impurity of the film, still remained, as was to be expected. In order to prove that the fault deos not lie with the preparation of the paper, the lecturer had made experiments with most of the kinds of positive paper to be obtained from the dealers, and had exposed pieces of the same size under the same circumstances of sensitiveness and illumination. All these, however, when transferred to glass and developed, showed in the enlarging apparatus the above mentioned defects. He exhibited a series of positives all obtained from the same negative on papers of different kinds, which fully proved the correctness of his observations. For demonstrating these facts to the meeting, the lecturer used his own improved enlarging apparatus. Liebmann's method of enlarging was next described. As is well-known, this consists in enlarging the original negative at once to the desired dimensions, carefully retouching the positive thus obtained, taking a carbon print from it, and finally transferring it to glass and developing. When now copied on to the carbon film, the rough and too highly grained parts of the negative are reproduced much more delicately than is the case on an albumen or salted paper. The lecturer here passed round a large positive and several carbon copies of the same. For this method, therefore, the carbon process is of immense advantage. In conclusion, the lecturer gave some demonstrations with his own apparatus, working with the petroleum and lime-lights, and showing that with both of these sources of light he could obtain excellent results.

The lecture was followed by a lively discussion, in the course of which a new experience was made. By a mistake the silver bath intended for the paper had been used for sensitizing an iodo-bromide of silver plate; as might naturally be expected, the plate, in consequence, failed to act, though the reason was soon detected, and the fault remedied. But soon afterwards a piece of developing paper was sensitised in the same bath and then exposed, when it gave evident signs of fog, and, besides that, of under-exposure. This phenomenon was attributed to different causes by the members attending the meeting. Some were of opinion that the bath was in fault. On the other hand, Dr. Harnecker believed that the real culprit was the cigar-smoke which, during the lecture, had filled the room. Herr Georgi, and with him ultimately the majority of the meeting, agreed with the last speaker, and expressed an opinion that it would be quite impossible under such circumstances to obtain a picture free from this defect.[*]

Herr A. Vogler submitted to the notice of the Society a camera shutter, intended to work in the same way as Cadett's pneumatic shutter, the pneumatic tube, however, being replaced by a draw-string. Naturally, this proposition gave rise to an animated discussion, in which Herren **Th. Joop**, **Georgi**, **Haube**, and **E. Duby** took part, and it was finally arranged to make a comparative trial of the two shutters at the next meeting of the Society.

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[*] In a note on this subject, Herr Duby states, as the result of subsequent experiments, that silvering a collodion plate in such a positive bath would not cause fogging, but would considerably reduce the sensitiveness of the paper.

Berlin Association for the Promotion of Photography.

The first meeting of the Association after the vacation was held on the 20th September, when, in the absence of Professor Vogel in Paris, Herr **Prumm** took the chair.

The Chairman announced to the meeting the death of a colleague, Dr Schimann, the news of whose early decease was received with marks of deep sympathy.

A letter was read from Herr **Majorkiewitz**, in which he described a new wooden screen for the glass room; and Herr **Martini** exhibited a novel camera-stand, for which he claimed the advantages of great simplicity, lightness, and firmness.

Herr **Prumm** submitted to the meeting Cadett's patent pneumatic shutter, which met with unanimous approval, except in the matter of price, which was thought to be too high.

Among other specimens of photography exhibited at the meeting were some remarkable landscape pictures produced by Herr **Holtermann**, of Sidney, in Australia. These are more especially distinguished for their size; they are mounted on an endless band of paper strengthened with linen, nearly 100 feet long. Two colossal panoramas of Sidney and Melbourne have been each made from about a dozen sheets, 18 by 20 inches, very skilfully joined together; the separate parts harmonize very completely in drawing, tone, and depth. The last on the list was a picture which, as could easily be seen, had been printed from a single negative, and its size, 150 by 93 c.m., showed it to be quite an uncommon photographic feat.

Herr **Prumm** and **Schaarvachter** gave an account of their visit to Paris, and their impression of the Exhibition; also a description of various photographic ateliers in that city, as well as some remarks on electric lighting.

At the next meeting of the Association on the 4th of October, Dr. **Vogel** occupied the chair.

Herr **Schaarwachter** submitted a number of finely etched plates for carbon transparencies of Paris manufacture; some of them are white, and others partly overlaid with coloured glass. This coloured coat has then been removed in places by continuing the etching, leaving it only in a pattern for ornament. The gradation of tone, obtained by the fineness of the etching, is worthy of great praise.

Herr **Kannenberg** exhibited some dishes made of glass plates fixed in wooden frames by means of newly invented cement, which is capable of resisting the action of any of the chemicals used in photography. Similar dishes were introdubed some years ago, but have lately fallen into disuse; they were cemented with marine glue or asphalte. One of these dishes of Kannenberg's, fifteen by thirteen inches, can be bought for seventy shillings; the high price is due to the invention being patented.

Herr **Martini** showed a collection of collotypes by Hoffmann, of Dresden, which gave an excellent idea of the capabilities of that establishment. Special interest was evinced in the reproductions of pictures in the Dresden Gallery. The firm of Hoffmann is now engaged in publishing a cheap collotype edition of the most celebrated galleries of Europe, thus enabling persons of limited means to become acquainted with the masterpieces of art. Among the prints which were exhibited on the present occasion may be specially mentioned Correggio's Last Supper, the Sixtine Madonna, Kaufmann's Sybil, the Titian Venus, and the Holbein Madonna.

A letter was read from Dr. **Richard**, of Mannedorf, in which he offers to give instructions in his "rapid process" at a reduced price. He expressed his willingness to make it known for the sum of 75f. per head, provided ten customers applied together, in order that it might be brought within the means of all; otherwise, for a single customer, the price would be 300fcs. At the same time, he sent a plate with two pictures taken by his process; the first in one, the second in two seconds, but marked by extraordinary softness.

Herr **Marowsky** praised the negative highly, considering the very short time of exposure.

Herr O. **Lindner** maintained that with a strong light, and in a perfectly open studio, he would be able to work almost equally quickly.

Herr **Hartmann** thought it premature to express an opinion on the process after seeing only one negative, and in ignorance of the circumstances under which it was produced.

Prof. **Vogel**, in compliance with a request, gave his opinion on electric lighting. He believed that at present the cost of the electric light was in excess of that of a light of equal power produced from gas; this circumstance, however, will not prevent the light from being brought into use for photographic purposes, especially since Vander Weyde has shown its efficacy for taking portraits directly.

Herr **Prumm** exhibited to the meeting the improved sciopticon of Max Fritz, of Gorlitz. This instrument is distinguished from older ones of the same kind by its giving a much stronger light, and especially by the fact that the outline of the flame is not projected so clearly on the screen as in other constructions, so that the field is more equally illuminated.

A number of magnificent views of the Paris Exhibition were exhibited to the meeting by means of this apparatus, and gave unlimited satisfaction.

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Talk in the Studio.

Arctic Photographs.—Sets of the photographs taken during the Arctic Expedition will be presented to the British Museum, the South Kensington Museum, the United Service Institution, the Royal Artillery Institution at Woolwich, the Royal Engineer Institution at Chatham, and some other Government and official institutions.—*English Mechanic.*

Electric Light.—Mr. T. J. Harrison, of the London Stereoscopic and Photographic Company, states that the company will shortly have an electric light equal to 1,200 sperm candles for the lighting of their Regent Street premises, at a cost of 4d. per hour.—*The Stationer.*

Indecent Photographs.—At the Middlesex Sessions, before Mr. Serjeant Cox, Deputy Assistant Judge, John Cave, photographer, was indicted for selling and uttering certain lewd and indecent prints and photographs, to which indictment he pleaded guilty.—Mr. Besley, instructed by Messrs. Collette and Collette, prosecuted on behalf of the Society for the suppression of Vice; Mr. Montagu Williams appeared on behalf of the defendant.—The defendant is a photographer, and his place of business is at 101, Euston Road, and an agent of the Society having obtained an introduction to the defendant by means of a friend, went to this place on the 24th of October, having previously been in communication with Inspector Kerley, of the detective department. Believing that dealings might be carried on with safety, the defendant showed the Society's agent two photographic pictures, which he afterwards purchased for ten shillings, and at the same time an arrangement was made that they should meet again outside Drury Lane Theatre on the following day. On the 25th the agent and the defendant met at the Two Spies publichouse, Catherine Street, where five more pictures were purchased, and for which nine shillings were paid. After the last purchase the pictures were taken to Bow Street Police Station, where they were marked by Inspector Kerley for the purpose of identification. After this last purchase an appointment was made to meet the defendant again at his place in the Euston Road on the 30th. The agent accordingly kept the appointment, when another purchase of similar articles was made, the agent having been previously searched by Inspector Kerley. A warrant was subsequently obtained to search the premises and to arrest the prisoner, and he was actually engaged in exhibiting some of the articles when the officers went in to arrest him. The premises were searched, but no other photographs of the same description were found. In consequence of the continued exertions of the Society, it was part of the system pursued by the dealers in such articles never to keep a stock upon the premises, but to obtain a supply from the manufacturers as an eligible opportunity presented itself for a sale of them. Many of the originals of these pictures were well known to the police.—Mr. Montagu Williams urged, on the part of the defendant, a merciful view to be taken of this case, as nothing was known of him before, no stock of the articles was found on the premises, and he would never have sold them at all had he not been enticed to do so by the agent of the Society.—Mr. Serjeant Cox sentenced him to be imprisoned and kept to hard labour for nine months.

Photography and Meteorology.—*The English Mechanic* says:—"The Secretary of State for India has sanctioned arrangements for taking daily photographs of the sun at some station in India, in order, we presume, to test the truth of the alleged connection between sunspots and Indian famines. The arrangements are to be quite provisional for a period of two years, and the photographs are to be sent to England for examination. It is satisfactory to learn that the solar observatory has not yet been put upon the Indian revenues, but the taking of photographs for the avowed purpose of comparing the sun's disc with the records of rain opens the door for the establishment not of one solar observatory, but of several throughout the empire of India, for obviously the examination of the sun at Calcutta cannot throw much light upon the probable rainfall at Madras!

Marking Ink Without Nitrate of Silver.—One drachm of aniline black is rubbed up with 60 drops of strong hydrochloric acid and 1½ oz. of alcohol. The resulting liquid is then to be diluted with a hot solution of 1½ drachms of gum-arabic in 6 oz. of water. This ink does not corrode steel pens; is affected neither by concentrated mineral acids nor by strong lye. If the aniline black solution is diluted with a solution of 1½ oz. of shellac in 6 oz. of alcohol, instead of with gum water, an ink is obtained which, when applied to wood, brass, or leather, is remarkable for its extraordinary black colour.

To Correspondents.

⁂ The Year-Book of Photography for 1879.—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue, we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

James Sanders.—The pinholes in your plates are chiefly accumulated at one end, and that fact, coupled with the circumstance that you only make a small quantity of silver solution, suggests the probable cause of your trouble. It appears to us to be caused by dust and turbidity generally. Particles of dust, &c., at the bottom of your bath will be easily stirred up—at the bottom of a small bath every time a plate is immersed—and these particles, resting on the film, will cause the irregular pinholes. It is a good plan always to work with a large quantity of solution, and to have the shoulder on the dipper, upon which the plate rests, an inch or two from the bottom of the dipper, so that the plate does not reach the bottom of the bath, or come into contact with any turbid particles at the bottom of the solution.

Erin.—The canvas or calico for a background screen should not be either damped or wet before stretching on the frame. Allow it to be stretched or strained gently, and secured with tacks; it may easily be made tight enough in this way. To get a good dead surface, use distemper colour; and to prevent this rubbing off easily, use plenty of size. You will get the materials at any oil and colour shop. Burnt umber and whiting, with a little black added, make a good mixture. You may make a size with glue, or buy the patent size of the oilman. The proportion necessary to make the colour bind, and not come off, you must ascertain by experiment. Bear in mind, it must be used warm.

Mr. Horner.—The minute white and yellow spots on your prints belong to a class very difficult to assign a certain cause to. Similar spots often arise from the formation of small bubbles in the print whilst fixing; sometimes from the albumenized paper having been long kept, and in a dampish place; sometimes from defective mounting cards, and sometimes from dust of chemicals, such as chloride of lime, or of mercury floating, and coming into contact.

H. C. Jennings.—Many thanks.

C. H. Charles.—Obtain from an oil and colour shop some burnt umber, and add a little whiting; this mixed with size, to give it proper body and adhesiveness, will give you a suitable background. Remember the colour must be applied warm. A good encaustic paste for prints is made by dissolving white wax in oil of lavender to the thickness of a paste. Sometimes a little of some resin is added to give hardness and toughness. We have published many recipes. We will repeat one if you cannot refer back.

P. Salmon.—The stains caused by mildew and age on engravings are not difficult to remove; those by getting wet will, we fear, be more troublesome. We have not had sufficient experience in cleaning engravings to vouch for the success of any plan. We have cleaned old discoloured engravings by the use of chloride of lime and water, and gentle sponging, finishing with copious rinsing with clear water. But we should regard any attempt we made now as altogether experimental. 2. A swing-back is useful for many purposes, but most important in taking architecture. In order, for instance, to include the whole of a high building it is often necessary to tilt the camera; and this will cause the lines to converge at the top, and so make the building out of upright. A swing-back will rectify this by bringing the plane of the object and the plane of delineation parallel to each other. Violent perspective—that is, objects rapidly appearing to diminish in size—is caused by the use of lenses of short focus, too close to the object.

J. S. Cox.—The chief thing required in leaving plates to be intensified and fixed at home, after exposing and developing in the field, is a means of keeping the film moist, and of preventing the action of development going on. Various solutions have been used for the purpose; but nothing answers better than golden syrup and water in equal proportions. This poured over the developed plate and drained off, will allow the plate to be kept twenty-four hours before intensifying and fixing. When these processes are to be carried out the plate is well rinsed, and the intensifying solution and a few drops of silver solution applied. Should any tendency to fog or stain be manifest, take a solution of—

Iodine	1 grain
Iodide of potassium	2 grains
Water	1 ounce

and pour over each plate before intensifying; allow it to remain three or four seconds, and wash the plate, then proceed to intensify, and all will go well. The iodine you have will doubtless serve. It should have been kept in a stoppered bottle, as it inevitably destroys a cork. 2. When an image comes up quickly and satisfactorily, and then rapidly becomes weak and faint, it generally indicates over-exposure. A weaker developer with more acid will help you in such case, by giving you more time and control over the picture. Besides, a weak developer tends to produce more contrast and vigour, especially when the exposure is full.

Egbert.—The writer you quote says one ounce of acetic acid for the pound of iron solution, and we should think that would be about the right proportion.

John Carder.—All communications on the subject of registration should be addressed to the Publisher, as the matter does not come under the attention of the Editor. We may explain here, however, that such registrations are made within a day or two of receipt of the proper instructions. No acknowledgment or record of registrations is supposed to exist, except that entered in the registration books at *Stationers' Hall*. It is our custom, not as a matter of right, but simply of convenience, to record from time to time the registrations which have been effected for readers of the News by the Publisher. This is done at intervals, as we have space to spare, and in rotation. Your print will doubtless be entered in its due order. 2. To make an albumenized print transparent, first soak it in hot water containing a little soda, to remove the size, then saturate it with white wax or with castor oil, or with almond oil.

Smudge.—We are glad you found the plan we suggested successful.

H. Woolton.—We posted to you the required address.

PHOTOGRAPHS REGISTERED.

Mr. Bevan, Lowestoft,
Photograph of Walberswick Ruins.
Photograph of Convent, Dunwich.
Photograph of Gates, Bishop's Palace, Dunwich.
Photograph of Church and Ruins, Dunwich.
Photograph of Cove Hythe Church.
Photograph of Interior of Southwold Church.

Mr. J. Patrick, Kirkcaldy,
Two Photographs of Wemyss Castle.

The Photographic News, November 22, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Royal Society Medals for 1878—The Faraday Lecturer, M. Wurtz—Dr. Draper's Last Discovery—Electric and Gas Illumination.

The Royal Society Medals for 1878.—We are glad to see that the Royal Society, in deciding the recipients of the annual medals they distribute, have not forgotten the claims of Swiss and French chemists, who about a twelvemonth ago succeeded in expunging the word "gaseous element" from our chemical hand-books. M. Pictet, of Geneva, who was first to announce the liquefaction of oxygen, and M. Cailletet, who followed so closely on his heels with the liquefaction of hydrogen and nitrogen that their names are now always coupled, are both of them to receive a Davy medal. Certainly there is no other discovery in chemistry during the past year that can vie with these, for now no one can take exception to the theory that elements may exist in the gaseous liquid and solid form, and there are at this moment no elements which are only known in the form of gas. Oxygen, hydrogen, and nitrogen, which have so long withstood the exertions of chemists to resolve them into another state, are now no longer to be defined as mere gases, and the word gas will henceforth be dissociated with the elements. Pictet, after succeeding in liquefying oxygen, proceeded to experiment with hydrogen, and, like his friend Cailletet, obtained this also in a liquid state. Nay, he went further, and actually secured, as the result of one of his experiments, solidified hydrogen. He has determined the specific gravity of both oxygen and hydrogen in this condition, and quotes their weights respectively as ·9883 and ·9787. Indeed, a more exhaustive research upon the subject than M. Pictet has afforded is scarcely to be conceived, and it is with deep regret that all who are interested in these important results will learn that the Swiss chemist has made his grand discoveries at the sacrifice of health and strength. The loss of one of his eyes has followed his hard exertions, and at one time it was feared that his brain too was affected. He still lies in a very precarious position, and his life is by no means out of danger. At first it was feared that his health and strength were gone for ever, and that softening of the brain had set in; but this seems not to be the case, and recent report tells us that his cure, though gradual, is by no means hopeless.

The Faraday Lecturer, M. Wurtz.—The Chemical Society was *en fete* last week. The occasion was a discourse by Professor Wurtz, of the Paris *Ecole de Medecine*, who had been chosen Faraday lecturer for the present year. He gave his discourse in French at the Royal Institution, the subject being the constitution of matter in a gaseous state. His lecture is better described as an oration, for M. Wurtz, though he spoke in French, expressed himself so clearly, and withal with so much spirit and animation, that there were but few of his audience who could not follow him. He commenced with an allusion to Faraday's early successful labours in liquefying chlorine, and then followed allusions to the recent results of MM. Pictet and Cailletet. The Faraday lecturer receives from the President of the Chemical Society, at the close of his discourse, the Faraday medal (which, in this instance, was cast in that rare metal palladium), and is usually entertained subsequently at dinner by the Fellows of the Society. In this instance the dinner was held at Willis's Rooms, when some hundred and fifty British chemists welcomed Professor Wurtz as their guest. On this occasion the talented *savan* spoke in English, and acquitted himself as ably as he had done in his mother tongue the day before. Mr. Spottiswoode, the president designate of the Royal Society, was present, as were also Professors Huxley, Odling, Frankland, Abel, Tyndal, and most of the leading scientific men of London; and, incredible as it may appear for a dinner at Willis's Rooms, there was not a guest "with a handle to his name."

Dr. Draper's Last Discovery.—In Dr. J. W. Draper's *Scientific Memoirs*, just published by Sampson Low, there is a very curious experiment discribed. Dr. Draper says that "if on such a surface (a metal plate covered with gum, and then dusted over with finely-powered phosphorus), a key or other opaque object be laid, and it then be exposed for a moment to daylight, on carrying it into a dark room, and removing the key, a spectral shadow will be seen, depicted in black, and its contour marked out by the brilliantly-glowing phosphorus surrounding it. After continuing to shine for some minutes, the light gradually fades, and finally becomes extinct. If, this having been accomplished, the phosphorized plate be put away in a box or drawer where not a ray of light can reach it, and kept therein for days or even weeks, on exposing it in a dark room, on a plate of warm metal, the phantom-shadow will emerge, perhaps, even more strongly than at first." Thus we have the phenomena of phosphorescence and photography very closely allied, and it would be difficult to say under which heading the experiment should be classed. The light is absorbed by the glowing phosphorus, and when taken into the dark, one sees the light still there. The experiment reminds one a little of that made by Niepce de St. Victor, who, it may be remembered, proved very conclusively that certain objects, white ones more especially, absorbed the light. Thus he found that a piece of white porcelain, after exposure to bright sunlight, if taken into the dark, was capable of impressing a sensitive film. The porcelain was placed in contact with an iodide of silver film, and this was acted upon as readily as if it had been impressed by daylight itself. It was this experiment of Niepce de St. Victor, proving that light could be stored up in an object and subsequently extracted from it, which has been taken as the fulfilment of the prophecy made by Dean Swift in *Gulliver's Travels.* In the island of Laputa, it may be remembered, the *savans* of the day are described as being busy, among other things, about extracting daylight from cucumbers. There is little doubt that if a white porcelain substance can retain light and give it up, that slices of cucumber would do the same, so that Swift's account of the Laputans was not so preposterous, after all. Dr. Draper's interesting experiment, as we have said, belongs rather to phosphoresence than photography; but there would seem no reason why a sensitive photographic film could not reproduce the picture of the key in the dark room.

Electric and Gas Illumination.—From Paris we learn that the expense of the electric candle, or Jablochkoff light, which illuminates the *Avenue de l'Opera* every night, is very great, and it seems doubtful whether the same will be continued unless the working cost can be reduced. Other electric lights—the Werdermann especially—is attracting a good deal of attention in the French capital, and a trial of it at the *Temps* office is at once to be made. Mr. Edison, of New York, must make haste if he wants electric lighting all to himself in the Old World, for already there are half a dozen good practical systems to choose from, in some of which the division of the light has already been attempted. While, too, electricians are thus busy, doing their utmost to perfect electric lighting, the gas authorities are working their hardest to improve gas lighting. With the assistance of such materials as naphthaline and the essence of mineral oils, they hope, with newly-constructed burners, to add very greatly to the brilliancy of gas jets. Of course it is not supposed for a moment that improved gas of this nature will compete in vividness with electricity, but, as we all know, the latter has to be softened down very much before it can be put to everyday use. It seems certain, therefore, that whether in the future we have gas or electricity, the public will be the gainers by the agitation that is now going on on the subject of improved illumination.

FRENCH CORRESPONDENCE.

THE ABSORPTION AND REPULSION OF THE CHEMICAL RAYS BY COLOURED CARBON SURFACES—THE AWARDS AT THE EXHIBITION ONCE MORE—SALE OF M. WALERY'S ESTABLISHMENT.

The Absorption and Repulsion of the Chemical Rays by Coloured Carbon Papers.—In one of my previous letters I made some observations on a most interesting discussion that has arisen between M. Leon Vidal and M. Paris, on the preparation of carbon tissue. Very recently I have received from M. Paris another communication on the same subject, containing some remarks that cannot fail of being of great practical interest to the readers of the PHOTOGRAPHIC NEWS. M. Paris lays down the principle that the time of exposure of emulsified papers must be regulated by the power of absorption or repulsion possessed by the coloured surfaces under the influence of light. Regarding it from this point of view, it may be said that two emulsions containing the same quantity of gelatine, but *different amounts* of the same colouring material, are not of the same colour; or, in other words, that the two emulsions have not the same power of absorption or repulsion when acted upon by light of the same kind. Thus, let us take two supports of any kind, each measuring five centimetres square; on the one we pour ten cubic centimetres of a five per cent. solution of gelatine, containing twenty grammes of Prussian blue, and on the other the same quantity of a similar solution of gelatine containing four grammes of the same colouring material; it will be at once evident that the two films, when dried, are not of the same colour, and, consequently, will not reflect to the same extent. This phenomenon is certainly worthy of being attentively studied by practical photographers. In fact, as M. Paris points out, when a piece of emulsified paper is cut for the purpose of placing it in the printing-frame, how is it possible to tell what quantity of colouring material is spread over its surface? This quantity may vary within indefinite limits; even the very persons who have prepared the emulsion would be unable to determine it even approximately. But if it be only a question of finding the chemical value of the coloured light reflected by the emulsified paper it will be easy enough. According to M. Paris's view, therefore, it is this chemical value of the reflected light that it is important to measure, and thus arrive at the determination of the actinic action of the rays that print the image through the photographic negative that is interposed like a screen. This problem M. Paris believes he has successfully solved, and he adduces numerous experiments carried out by himself, which control and confirm his results. He has drawn up the table given below, taking account at the same time of the physical properties and of the actinic co-efficient of the colours of the spectrum. Absolute black, though it does not exist in nature, has been taken at the starting-point when there is a *complete absence* of all actinism or *negative reflexion;* and absolute white, which also has no real existence, is taken as the other limit of the scale, the *maximum of the chemical action of light*, or *positive reflexion.* This table has, therefore, a double reading, it gives for each colour of the spectrum the maximum of chemical reflexion, and the maximum of the chemical absorption of the luminous rays falling on the coloured surface—in a word, the maximum of actinism and the maximum of inertia. It will also be notice dthat absolute black is taken as absorbing, and absolute white as reflecting, all the rays of light that fall on the coloured surface.

	Degrees of Absorption.
Absolute black, complete inertia, or negative reflexion ...	100
Relative or natural black	90
Orange ...	87·50
Green ...	75
Yellow ...	62·50
Red ...	50
Indigo ...	37·50
Blue ...	25
Violet ...	12·50
Relative or natural white	10
Positive reflexion	0

	Degrees of Repulsion.
Absolute white, complete actinism, or positive reflection	0
Relative or natural white	10
Violet ...	12·50
Blue ...	25
Indigo ...	37·50
Red ...	50
Yellow ...	62 50
Green ...	75
Orange	87·50
Relative or natural black	90
Negative reflexion	100

As will be seen by casting a glance over this table, all the degrees of absorption or negative reflexions have, as complements, all the degrees of repulsion or positive reflexions. For example, yellow, which is given in the table 62·50, has for its complement indigo, which is given 37·50. By adding—

The yellow negative reflexion ...	62·50
The indigo positive reflexion ...	37·50
We get exactly	100·00

which is complete absorption. The table may be used in two ways; either by graduating a prism in accordance with the numbers above given, and examining afterwards the emulsified papers with this prism; or by providing a series of coloured and transparent screens, each of which reproduces not only the colours of the spectrum, but also the different tones between these colours, and by then superposing each of these screens on the paper to be examined. When the coloured surface viewed through the screen produces the impression of absolute black, all to be done is to substract the value of the coloured screen from 100 to obtain the number corresponding to the reflexion produced by the emulsified paper. For instance, suppose a screen, through which the paper is viewed, producing thereby the effect of absolute black, to be marked 17·50; the paper should then bear the number 82·50, as that is the difference between 100 and 17·50. This formula will then signify that the paper under examination absorbs 82·50 of all the chemical rays that impinge on it; and, all other circumstances being equal, it will require more than three times as long an exposure to produce the same effect as on a paper which absorbs only 25. I have gone at some length into a description of these researches of M. Paris—researches which he has promised to continue—because they appear to me to be of a character to facilitate and improve the methods of printing which, up to this time, have depended upon formulæ or rules more or less vague and uncertain. There is, however, no doubt that M. Leon Vidal will also have something to say in reply to these opinions, for they have been formed as the result of investigations similar to those on which he himself has been engaged; and I propose, as soon as he sends his observations to me, to reproduce them for the benefit of my readers.

Awards at the Exhibition.—The agenda of the next meeting of the *Chambre Syndicale des Photographes* contains the promise of a communication and of a proposal on the subject of the awards at the International Exhibition. I am not aware what position it is intended to take up, but I shall not fail to send a full report to the PHOTOGRAPHIC NEWS. However great the agitation with regard to the awards may have been at the time of the distribution of prizes, it would seem now to have nearly subsided.

Transfer of Walery's Establishment.—On the other hand there is at present much talk about the transfer of his business which M. Walery has made to M. Schemboche, of Florence. This news has taken the photographic world of Paris by surprise, and has assumed the proportions of an event of great importance. The sale has been attributed on the one hand to more or less sentimental motives, on the other, all sorts of fabulous sums have been mentioned as the price. It may, however, be taken as certain that M. Schemboche has now every means at his disposal for enrolling himself among the number of first-rate photographers. Ernest Lacan.

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

In the previous divisions of his treatise the author has considered only potassium bichromate as the sensitizing re-agent on gelatine, because its action is typical of that of all other salts. The use of the different other chromates, however, calls forth many variations in the degree and mode of action, and these he proceeds to describe in the next chapter.

The acid chromates of potassium, sodium, ammonium, lithium, and magnesium, act on the solutions of gelatine, gum-arabic, albumen, &c., at first exactly like the neutral salts. All the bichromates produce the insolubility after more or less long continued boiling, but the mono-chromates have no effect; they manifest the same behaviour when, after being dried, they have been kept for a long time in the dark. It is an interesting and important fact that the mono-chromates of the fixed alkalies, as well as of magnesium, are, when mixed with gelatine, sugar, or other organic compounds, very slightly sensitive to light. This was observed by Ponton as far back as 1839, and has lately been confirmed by Liesegang, though Monckhoven maintains that potassium mono-chromate is better for the purposes of carbon printing than the bichromate, on account of its greater solubility. To settle this disputed point, the author repeated the experiments. He floated carbon paper on a five per cent. solution of potassium mono-chromate, and, after drying, exposed it; he also exposed a glass plate coated with gelatine, that had been soaked in a ten per cent. solution of the same salt. In neither case was any appreciable effect produced, even after the light had been allowed to act for a whole day. Carbon paper which has been sensitized by mono-chromate requires to be exposed from twenty to fifty times as long as that sensitized by bichromate, in order to produce the same effect.

It is a remarkable fact that ammonium mono-chromate forms an exception to the rule that the mono-chromates are not sensitive to light. This appears to be due to the circumstance that the combination of ammonium with chromic acid is not a very close one, so that it escapes the reduction of chromic acid to chromic oxide produced by the action of light. The mono-chromate, both in solution and in a crystalline form, is an unstable compound, and is continually losing ammonia, so that chromated gelatine, if it is not prepared and treated with the greatest care, contains in reality ammonium bichromate when it is exposed to the action of light. This hypothesis can be clearly shown to be correct, by the following experiment. A solution of potassium bichromate, neutralized with potash, is mixed with gelatine, dried, and then exposed; no image will be obtained. But if the neutralization be produced by ammonia (until the solution is of a light yellow colour) the gelatine will be quite as sensitive as that treated in the usual way with potassium bichromate. Following the reaction in this process still further, it will be seen that potassium bichromate is decomposed by organic bodies with the formation of chromic oxide and mono-chromate. Ammonium bi-chromate is also decomposed in the same way, but the resulting ammonium mono-chromate is, in contact with gelatine, just as sensitive as the bichromate, and if the exposure to light be continued, the reduction will proceed until all the chromic acid has been reduced to chromic oxide. This property renders ammonium chromate valuable, for in using it for photographic purposes we make the whole of the chromic acid available, whereas with the potassium salt we get only half the amount. On this account, plates prepared with the ammonium chromate are more intense than those prepared with the potassium chromate under the same circumstances of exposure, and with equal quantities of the salts.

The atomic weights of the two bichromates are so very different that substituting the one for the other cannot but have an important effect. According to the formula, twelve parts by weight of ammonium bichromate are equivalent to fifteen parts of potassic bichromate. Considering that with the former salt, double the amount of chromic acid can be made available, the circumstances appear to be even more favourable, for, according to theory, six parts of the ammonium bichromate must thus be equivalent to fifteen parts of potassium bichromate. In practice, this proportion is scarcely so large. The author's experiments led to the result that with gelatine two parts by weight of ammonium bichromate was equivalent to three parts of potassium bichromate—that is, these proportional quantities of the two salts produced the same sensitiveness to light, and the same degree of insolubility after an equal duration of exposure.

Notwithstanding this preponderance of advantage in favour of the use of the ammonic salt, there seems to be not so great a benefit derived from its employment in photographic processes. This may be accounted for by the fact that the exposure is seldom carried so far as to produce decomposition of the whole of the bichromate. Though the potassium bichromate yields a less amount of chromic acid, it yet gives enough to produce the formation of the image. In practice, therefore, no advantage accrues from the use of the ammonium over that of the potassium salt, added to which, photographic films treated with the former salt decompose more easily than those treated with the latter. Another point of importance, especially where, as in modern carbon processes, alcohol is added to the chromate bath, is the fact that ammonium bichromate is much more soluble in dilute alcohol than potassium bichromate; we can therefore add considerably more spirits of wine to an ammonium chromate bath than we can to one of potassium chromate. But, on the whole, though he can recommend the use of the ammonium salt, the author finds that the same results can be obtained nearly as well with the potassium salt.

As has already been observed, the alkaline mono-chromates possess the property of not acting on gelatine even after long keeping in the dark, nor yet by exposure to a moist and warm atmosphere. The mono-chromates should therefore be of great advantage in preserving chromated gelatine as long as possible. Unfortunately, the bichromates, both of potassium and sodium, when mixed with organic bodies, are not sensitive to light.

A gelatine thus prepared, however, may be kept for many weeks in the dark, and will not in the slightest degree lose its solubility, and a plate coated with it becomes highly sensitive on being fumed with acetic acid. The light yellow colour becomes gradually an orange with the formation of bichromate and acetate of potassium, and the stickiness which resulted from the fuming disappears after the lapse of an hour.

Of all the mono-chromates, that of ammonium is the only one which possesses sensitiveness to light, and yet shares with the others the property of keeping gelatine soluble in the dark. On this account, the addition of ammonia to ammonium bichromate has been employed with advantage in the collotype process, for gelatine films prepared in this way can be kept for a much longer time in the dark, and preserve their sensitiveness longer than those in which no ammonia has been used. But the most feasible plan seems to be to create a double salt, by inducing half the chromic acid in pure bichromate of potassium to combine with ammonia; in this way a double mono-chromate of potassium and ammonium is obtained, which is much more durable than (though quite as sensitive as) potassium bichromate. The preparation of this double salt is easy. It may be obtained in the form of light yellow crystals, which, under exposure to the air, turn a beautiful red, either by neutralizing a boiling solution of potassium bichromate with ammonia, and allowing it to get cold, or by precipitating slowly an ammoniacal solution of the same substance with strong alcohol. For photographic purposes it is not necessary to have the salt in the crystalline form; ammonia is added to a solution of potassium bichromate until it becomes of a light yellow colour, when it may be used for chromatizing the gelatine. Gelatine which has been treated with the double salt has a lighter colour than that produced by the admixture of potassium bichromate; but when exposed to the light it becomes nearly equally dark. The employment of the double chromate of ammonium and potassium is more especially advantageous in the collotype and photo-electrotype processes, because the films are not so soon insoluble.

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* Continued from page 521.

The author appears also to have experimented with other mono-chromates and their double salts, but without obtaining any better results. The double chromate of lithium and ammonium, which is obtained by saturating with ammonia a solution of lithium bichromate, forms red-brown acicular crystals, which are stable in the open air: in collotype and carbon printing, it acts like potassium bichromate. The double chromate of ammonium and magnesium is more difficult to prepare, and possesses no advantages over the double salt of ammonium and potassium, which has already been described, while the double chromate of potassium and magnesium is perfectly insensitive. All these salts, as well as sodium chromate (which crystallizes with greater difficulty than that of potassium, and is also much more difficult of preparation), are not likely to drive the more common chromates of potassium and ammonium out of the field.

The trichromates cannot be used in photography, because they all behave almost in the same way as free chromic acid. Plates prepared with these salts soon become spontaneously insoluble; after being exposed for a very short time to the light, they become completely insoluble in hot water.

Bichromate of copper can be obtained by treating potassium bichromate with cupric sulphide in the form of rich brown acicular crystals, which are liable to effloresce; the solution, in boiling, deposits the basic salt. Gelatine treated with this salt is not precipitated, and becomes sensitive to light, but it has not been used in photography.

Chromate of mercury added to organic bodies is tolerably sensitive. For photographic purposes it is best obtained by treating the chromated gelatine films with chloride of mercury. If it be attempted to produce the salt directly by adding potassium bichromate to chloride of mercury salt, they do not react on each other, but produce a double salt of potassium bichromate and chloride of mercury.

Chromo-chloride of potassium decomposes in the presence of organic bodies as rapidly as chromic acid. A paper soaked in a solution of this salt, obtained by adding potassium bichromate to concentrated hydrochloric acid, contains really a mixture of the two substances. Exposed to light, the hydrochloric acid converts the chromic oxide, that is formed, to chloride; the latter is of a light green colour, and, therefore, there results a light image on a dark ground.

(*To be continued.*)

GELATINO-BROMIDE EMULSION.

Inasmuch as some of our clients who are sufficiently advanced in the routine of wet-plate and dry-plate photography have manifested a desire to make their own dry plates, but have not been well acquainted with the best manner of setting about it, we give the following practical details of the gelatino-bromide dry plates, and we hope so simply and lucidly that their meaning may be easily comprehended.

To make five ounces of gelatino-bromide emulsion:—

Formula.

Gelatine (Nelson's No. 1) ...	90 grains
Ammonium bromide	45 ,,
Silver nitrate	75 ,,
Water (distilled)	5 ounces

Select a twenty-ounce bottle with a securely fitting stopper First pour in four ounces of the water, dissolve therein the bromide of ammonium, then add the gelatine, and leave to soak for one hour. The advantage of a well-fitting stopper will be obvious; for if, in shaking up, any of the liquid were lost, some of the bromide salt would go therewith, and the balance would be disturbed. There is a manifest advantage in first dissolving the bromide salt in the water, for we thus succeed in evenly and equally distributing it throughout the whole body of the gelatine; and, if precaution be taken in regard to the stopper of the bottle, there need be no loss of bromide. Next, dissolve in a separate bottle seventy-five grains of nitrate of silver in the remaining ounce of water. Place the two bottles in a jar or jug of water of 100° temperature, and solution of the gelatine will quickly take place. Now carefully unite (in the dark room, of course) the contents of the two bottles. The nitrate of silver solution may be slowly stirred into the bromized gelatine, or it may be added in small quantities with a thorough shaking between each. Either method, if well done, is efficient. We have now a gelatino-bromide emulsion containing a slight excess of bromide, and this slight excess, while not in any marked degree detracting from its sensitiveness, will be found of eminent service when we arrive at the developing stage. By the addition of the nitrate of silver to the bromized gelatine an action termed "double decomposition" is originated; in other words, an interchange of elements takes place between the two salts. If nitrate of silver were added to water containing bromide of ammonium in solution, an interchange of elements would instantly take place; insoluble bromide of silver would subside, and nitrate of ammonium would remain in solution. But gelatine, being a viscid medium, retards this chemical interchange, and therefore time must be given to bring it completely out. In order, therefore, to keep the gelatine in a liquid condition, we place the bottle in water of 100° temperature, and it is found in practice that a period of from four to six hours will complete the double decomposition.

If water of a higher temperature than 100° be employed, the interchange will be completed in a shorter space of time, as the gelatine, being thereby rendered more limpid, presents less obstacle. But we must bear in mind that 100° is a safe temperature, and that a higher temperature can only be employed at the risk of decomposing the gelatine, the results of which would be inconvenient at the final stage of development, these results being blisters and frilling.

A period of six hours having been given for digestion, take out the bottle of gelatino-bromide emulsion, and pour the emulsion into a flat dish to set, and, when so set, the final operation may be performed It will be seen from the foregoing remarks that the gelatine holds in suspension two compounds—bromide of silver and nitrate of ammonium. The former is the sensitive salt; the latter is matter in the wrong place, and must be removed, or it will crystallize on the plates and spoil them. In order to remove the nitrate salt in the most effective manner, we have found the following method all we could desire:—

Apparatus Required.—1. A bag made of that "napless" canvas which ladies employ as the basis for Berlin wool work. 2. A trough (say) twelve by ten inches, and ten inches deep, and fitted with tap to draw off the water, with a ledge around the inside, about two inches from the top to support. 3. A tray with wooden sides and calico bottom.

Scrape the gelatine up with a strip of glass, and transfer it to the canvas bag; close the aperture of the bag, and, by the pressure of the thumb and fingers, force the gelatine through the meshes of the canvas into a basin of water. We now have the gelatine in extremely fine division; but it is also mixed with a vast excess of water. Now we pour the whole on to the tray with the calico bottom, and the water will pass off, leaving the gelatine high and dry. In order that we may be sure that the proper amount of work is done, it is well to fill up the trough with a fresh supply of water, and let the tray float upon it for ten minutes.

When the water has been finally drained off we transfer the gelatine to a bottle, stand it in hot water, and, when dissolved and filtered, it is ready for coating the plates. This latter operation is difficult for a beginner, and inasmuch as the plates require a long time to dry—from twelve to twenty-four hours—he must have a room or drying-box fitted up expressly to keep out light during drying. When the plates are coated they must be laid on a levelled surface to become set, and, so soon as set, they may be stood up or placed in the box to dry.—*Anthony's Bulletin.*

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PHOTOGRAPHIC ENGRAVING.

BY CAPT. J. WATERHOUSE, B.SC.*

The earliest practical process of photography was a method of photographic engraving invented by Nicephore Niepce, and since his time nearly every great improvement in photography has been applied to this object. Thus, no sooner was the Daguerreotype invented than essays were made by Fizeau, Donné, and others to engrave the images produced on the metal plates. In like manner, the earliest application of the peculiar action of the alkaline bichromates upon colloid substances was Fox Talbot's photoglyphic process, which was soon followed by the photo galvanographic and helioplastic processes of Pretsch and Poitevin. Engraving processes have also been based upon Swan's pigment-printing process, the Woodburytype, and the collotype. With the exception, perhaps, of the second, all these methods, from the earliest to the latest, are in use at the present time in a more or less modified form.

The object of engraving maps upon copper is to obtain a plate taking but little storage room, and not liable to break, which shall yield a large number of impressions of uniform quality, and, with due precautions, be capable of being preserved in a good condition for printing during any length of time.

Copper plates have the further advantage that they may be multiplied to any extent by electrotyping, and corrections may be made when required, either on the original plate or on the electrotyped matrix or copy. Transfers may also be made from them to stone or zinc, and printed in the same way as ordinary lithographs. This procedure is specially applicable when very large numbers are required, or when the subject is to be printed in colours.

Besides these more practical advantages, the superior beauty and finish of copper plate engraving give it the preference for all maps of a permanent or standard character.

With these objects in view, nearly every civilized nation has at least one engraved map giving the results of the State Surveys on a convenient scale for general use. For the same reasons map-publishers generally engrave the maps composing their atlases and other standard publications.

Notwithstanding its many advantages, copper-plate engraving is a very slow process, and is also expensive, because the art of the engraver is one requiring great artistic and manipulative skill, only to be fully acquired by an almost life-long apprenticeship. Map-engraving, it is true, does not require so high a degree of artistic skill as line or aqua-tint engraving; but it nevertheless requires a long training, particularly in the more difficult branch of hill-etching, which demands almost as much skill to produce first-rate results as ordinary line-engraving.

Although the advantages of photographic engraving as a means of avoiding the long and costly labour of engraving maps by hand are obvious, for various reasons these processes have not yet come into general use. A successful commencement has, however, been made by the Italian and Austrian Governments of employing photography in the production of their engraved maps, and there is little doubt that belong long photographic engraving will be more extensively used for this purpose than it is at present, especially as processes are now available by which gradation of shade may be obtained without difficulty, and the expensive hand-work of the engraving in biting in or finishing may to a great extent be dispensed with.

The processes of photographic engraving that have been proposed from time to time for producing incised images on metal plates capable of being printed in the copper-plate press are very numerous. I shall, however, confine myself to those which have been most successfully worked, and of which the details have been more or less fully published. Further information on the subject will be found in the special works referred to in the footnotes, and also in Hammann's "*Des Arts Graphiques destines a multiplier par l'Impression,*" and A. Martin's "*Hand-buch der Email-photographie und der Phototypie oder des Lichtdruckes,*" which both give very complete resumés of the early progress in this branch of photography, with details of many of the processes. The photographic journals and the Patent Office records may also be consulted.

The principal methods of obtaining an incised image on a metal plate by means of photography are:—

1. Obtaining a photographic image on a metal plate coated with asphaltum, and then etching or 'biting in' with acid.
2. Obtaining a photographic image in gelatine on a metal plate, and etching the latter with some substance that will not attack the gelatine.
3. Obtaining an image by the direct action of light on a metal plate, as in the Daguerreotype process, then forming a metallic reserve to protect either the lights or shadows of the image, and etching with a suitable mordant.
4. Electrotyping from a relief obtained by the swelling or partial solution of a chromated gelatine film, either directly, or by the intervention of a cast in wax or plaster.
5. Electrotyping from a relief in insoluble gelatine obtained in the same way as in the 'Autotype' or pigment-printing process.
6. Electrotyping from a leaden plate on which an image has been impressed from a gelatine relief, as in the Woodburytype process.
7. Electrotyping from a relief obtained directly on a collodion positive cliché.

It will be seen that these methods divide themselves into two principal groups of etching and electrotyping processes.

Etching Processes with Asphaltum.—We have already seen that Niepce, in his experiments to find a substitute for lithography, made use of the property possessed by bitumen of Judæa, or asphaltum, of becoming insoluble in oil of lavender and other solvents, after exposure to the action of light, to obtain photographic images on metal plates, which were then bitten in with acid, so as to form engraved plates, usually copies of engravings, though he also obtained images from nature.

(*To be continued*).

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* *Journal of the Asiatic Society of Bengal.*

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ENGLISH PHOTOGRAPHY AT THE VATICAN.

We have had the good fortune to examine during the last few days a series of portrait photographs of his Holiness Pope Leo XIII., and various cardinals, taken at the Vatican, by an English photographer summoned to Rome for the purpose. The whole circumstances are surrounded with associations of success and gratification of no ordinary kind. Mr. John Eastham, of Manchester, a well-known and highly-esteemed photographer of great experience, to whom the commission was entrusted, has achieved great success and very high honour for himself and the art.

It was no slight compliment to English photography, as well as to the gentleman in question, that he should be summoned to Rome to photograph the Pope and his court. And no little triumph to complete the commission so to give ordinary satisfaction. But the success in this case is so transcendant and complete as to render the affair altogether unique. As expressing his satisfaction, the Pope has created Mr. Eastham a Chevalier of the Order of St. Gregory. But this is not all. The Pope is so highly delighted with the portraits, that he has written a Latin epigram thereon, or rather on the art by which they are produced, and we are privileged to place it before our readers. Here it is, as copied from the Holy Father's autograph manuscript, written in a clear clerkly hand:—

Ars Photographica.

Expressa solis spiculo
  Nitens Imago, quam bene
  Frontis decus, vim luminum
  Refert, et oris gratiam!

O mira virtus ingeni!
  Novumque monstrum! imaginem
  Naturæ Apelles œmulus
  Non pulchriorem pingeret.

Leo P. P. XIII.

We append a versified English rendering by Father Johnson, a friend of Mr. Eastham:—

"Sparkling likeness, swift touch of the sun,
By a ray instantaneously splendidly done!
Minutely and truly reflecting each grace,
Noble brow, beaming eye, and beauty of face!
What a triumph of skill, as wondrous as new!
E'en the rival of nature, Apelles, ne'er drew
More beautiful picture, or portrait as true!"

When it is remembered that the Pope's home is in the centre of the highest art traditions of the world, and amidst the grandest monuments of the art skill of the greatest masters in painting and sculpture the world has known; that he daily exists in the midst of the greatest works of Michael Angelo, Raffaelle, Titian, Guido, and others equally great; and that he is not simply the head of the Roman Catholic Church throughout the world, but is a gentleman of high culture and scholarship, this compliment to the photographer's art will not be valued lightly. We congratulate Mr. Eastham heartily on his success under great difficulties, and that his very fine photographs now occupy places of honour in the Vatican amongst the choicest art treasures of the world.

A few words on the pictures and the circumstances of their production will interest our readers. It will be somewhat startling to many of them to learn that the negatives were produced as late as between six and seven o'clock on a summer evening and upon dry plates! In Rome, it may naturally be thought, the light is good; but it must be remembered that in southern latitudes the evenings rapidly close in. After once the light has begun to wane, the twilight is short, and the light rapidly loses power. Without the facilities afforded by extra sensitive dry plates, the task would have been much more difficult, if not impossible. As it was, the exposure was instantaneous, and the negatives were perfect. They were produced cabinet size, and, from these, Autotype enlargements of rare excellence have been made, which form really grand pictures; the skilful arrangement of simple accessories and background, and the fine light and shade, give them all the quality of fine old mezzotint engravings. A group of eight standing persons, with the Pope seated in the centre, is an admirably arranged picture. The excellence of the whole justifies the Pope's enthusiasm and that of the various cardinals who have added their autograph approvals to Mr. Eastham's album of testimonials. The plates were, we should add, sensitive gelatine emulsion plates, and in each of the cases where exposed for portraits in the garden of the Vatican, proved in every way excellent and spotless, whilst some others exposed on less important subjects proved faulty. On the subject of dry plates for portraiture we shall have some further experiences of Mr. Eastham's to detail shortly.

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ART IN POSING.

Our facetious contemporary, *Fun*, has an amusing satire on the want of variety in posing and arrangement manifest in the productions of many photographers. A whole page is devoted to the subject, consisting chiefly of illustrations.

First, a huge show-case, with a score or so of specimens, in which every figure is in one imbecile position. Photographer addressing a customer:

"You will notice the immense variety of poses in my portraits. Quite an art in itself to pose the subjects! I shall be able to make a first-rate picture of you!"

The next illustration is the interior of the studio, customer seated, and photographer addressing him:

"You see, I place you first in my patent posing machine —that machine is quite an art in itself, too."

The next illustration is the victim sitting in agony in a posing chair, provided with machinery to grip, twist, and torture every part of the body. The photographer continues:

"Then, by simply turning a handle or two, I screw you at once into a most natural and picturesque pose—quite an art. Put a little more contentment into the features, please."

The sitter, in the last stage of agony preceding confirmed insanity, remonstrates, and the photographer responds:

"What? 'Don't think the machine quite suits you?' 'Not a natural pose?' Would rather sit easily in a chair, so'? Oh, my dear sir, the idea is preposterous! Wouldn't do at all! No ART in it. Oh dear, you'll excuse me laughing at the notion!"

This, of course, is burlesque, and very unfair; its tone is an illustration of that affectation of contempt for photography and photographers which characterises some small artists. But there is, unfortunately, some ground for the implied charge against photographic portraiture. Ande curiously enough, it accords in implication with an article on an allied subject which we have had in type for some weeks, but which pressure of other matter has compelled to stand over, and will be published shortly.

THE LIGHTNING PROCESS.

The Boissonas' process, styled the lightning process in America, continues to make headway, and find appreciation. Mr. W. Notman continues amongst the disciples of the process, and has consumed, in a little over two months, over a hundred pounds of the collodion, one hundred and seventy bottles of developer, and four hundred and fourteen ounces of the silver, the prepared materials being sold to purchasers of the process. Mr. Napoleon Sarony has also become a disciple, and pronounces the process "the greatest success of the age."

In some recent comments on the success of the process in America, we mentioned the fact that there was some apparently honest opposition. Our esteemed friends, the Editors of *Anthony's Photographic Bulletin*, referring to this, think we are in error, and incidentally pay English journalism a high compliment. They remark :—

"The intelligent Editor of the London Photographic News has not shown his usual perspicuity in his survey of the position of the lightning process in this country. He is necessarily aware that the gentlemen who have certified as to the excellence of the mode of compounding the materials cannot be mistaken, and they testify to the truth. It does not follow, however, that the opposition necessarily arises from persons who are solely actuated by a virtuous desire to serve the public. Mr. Simpson is, probably, not aware that the photographic journals in this country are not conducted on the same principle of disinterestedness in trade matters as those of England, and when that is understood, it is not difficult to understand how the apparent antagonism is made to appear."

We are sorry if we have been misled by giving some of our contemporaries credit for honesty and independence they do not possess. It does not occur to us, readily, to impute interested motives for advocacy or opposition in such matters. We know Messrs. Anthony to be the oldest manufacturers and dealers in photographic matters in the States, probably in the world. Their *Bulletin*, very valuable as a journal, is, avowedly, chiefly issued as a trade organ, we understand, and we do not doubt their honesty and straightforwardness. If they are unfortunate enough to have contemporaries of a less disinterested and fair-dealing character, it is to be regretted ; but unfair journals assuredly come to grief. Dishonesty in journalism is always a failure, even commercially.

THE "ARTOTYPE" PROCESS.

We learn from our Philadelphia contemporary that the last photographic sensation in the States is the process above designated. A company is in course of formation to work the process, and the licences to use the patent are issued at five hundred dollars each. It is said to be the invention of M. Munch, of Bavaria. The following is the specification, which does not appear to us to be more lucid than the name is euphonious or scholarly.

"The invention consists, essentially, of forming on a transparent or non-transparent photographic printing-plate a film by a solution of albumen and soluble glass, and coating this film, after it is perfectly dry, by a second or sensitive film, that receives the photographing image from the negative in the usual manner.

"The first solution, by which the glass or metal printing-plate is coated by means of a brush or otherwise, is formed of seven parts of albumen, three parts of soluble glass, and eight parts of water. The film obtained by this solution is then dried, either slowly by exposure to the air, or quickly by artificial heat, as desired. When the film is perfectly dry it is washed in running water for about five minutes, care, however, being taken that its surface is not touched. After washing, the plate is placed in a rack and allowed to dry. The dry plate is then placed into a heating-oven, and when heated to about 212° Fah., or nearly so, the second or sensitive film is laid on the first film. The sensitive solution is prepared by dissolving fifty grammes of gelatine, fifty grammes of fish-glue, and fifteen grammes of bichromate of ammonia in one thousand grammes of water, and filtering it in a warm state through paper. As soon as this solution is uniformly distributed over the plate, the same is placed in the oven again for ten or fifteen minutes, until perfectly dry. The plate is then ready for the negative, and is exposed to the action of the light in the same manner as the common albumen paper, but only for about half the time, so as to receive the photographing image on the sensitive film. After the plate has thus been exposed to the light for the proper length of time, it is washed in running water for from fifteen to twenty minutes, until every particle of chrome-salt not affected by the light is washed out.

"After drying, the plate is ready for printing by the common lithographic inks and presses."

PORTABLE SCREENS IN PORTRAITURE.

A correspondent of our Philadelphia contemporary describes a visit to the studio of Mr. Kent, of Rochester, New York, whose name is associated with the invention of a hand-screen for use in controlling light in portraiture. There are some amusing comments at the expense of some English editor who has failed to appreciate this screen. To whom, or what editor, these remarks may apply, we know not, as, for our own part, we have always advocated the use of hand-screens, in controlling light, and now quote the further remarks for the hints on this subject they contain. The visitor remarks :—

"But the point of most interest to me was his use of the celebrated 'hand-screen.' I saw him make five positions, using the hand-screen, as I understand he does with every subject for bust portraits, and in neither case did the movement of the screen over the sitters' heads exceed ten or twelve inches, just enough to slightly modify the top-light, shutting out or letting in a little more or less on either side. My misconception of its use was almost as great as the editor of an English journal who, in a recent article described Mr. Kent as swinging his screen around his sitters' heads in a style quite likely to make them frightened and nervous.

"In speaking of how little its use was understood, I asked Mr. Kent if he had read the English editor's article. He said, 'Yes,' laughingly, 'and he must think I use it something like a wind-mill.' I think the prevailing idea of it is something about as vague and wild, while, in fact, it is only a more convenient and controllable form of the old stationary head-screen ; and the advantages sought and attained by its use are precisely the same, shutting out sharp high-lights, and giving a softened and diffused effect to the light. Yet Mr. Kent's pictures have none of the flat look of pictures taken under an umbrella ; they are full of detail in the lights, and very transparent in the well-defined shadows.

"Mr. Kent makes his bust pictures mostly under the light, working the camera all around the room looking towards that centre. Four out of the five sittings I saw were made with the camera nearly facing the side-light, the subjects sitting with their backs to the lights or nearly so. The side-light was quite heavily screened, although the day was cloudy, being covered up two-thirds its height with both white tissue paper and white muslin. The exposures were somewhat prolonged, from thirty to forty seconds, with what must have been very sensitive plates, for the light was very subdued, yet the negatives were vigorous and full of printing quality.

"The hand-screen used was a thin, white muslin, about two feet at the widest, stretched over an egg- or pear-shaped willow hoop at the end of a light pole, about the length and weight of an ordinary jointed bass fishing-rod. In fact, I am now using my rod in that way, and it answers admirably. Having used it since my return to business, I can confidently affirm that it is a very handy and useful implement for general use under the light, and almost indispensable for the best class of Rembrandtish effects. Its cost is almost nothing, and anyone can make it; facility of using it is easily acquired, and the right to use it has, I believe, been freely given. I would, therefore, candidly advise every photographer who wants to increase his power of controlling the light, to make one and try it. It is a good thing, and you *Kent* afford to be without it."

FERRIER'S ALBUMEN PROCESS.

The stereoscopic slides on glass produced by Messrs. Ferrier and Soulier have always and deservedly been held in high repute, for their exceeding delicacy, brilliancy, and rich tone; and the mode of producing them has been regarded as an important secret. They were known to be the result of a dry albumen process, and a method said to be that whereby the transparencies were printed was published some years ago in the Photographic News. Professor Stebbing, writing to our Philadelphia contemporary in praise of these transparencies, enters into minute details of the method of production. He says:—

I will treat the subject fully, and in the following order:

1st. The dark-room.
2nd. Preparation of albumen.
3rd. Cleaning and polishing the plate.
4th. Coating the plates with albumen, and drying.
5th. Sensitizing.
6th. Exposure and developing.
7th. Toning.

The first subject requires the most care. The dark-room must be very small, the ceiling and the walls painted in oil, the floor laid with marble or slate slabs, a large sheet of plate-glass fixed to serve as a table, a kind of cupboard with levelled glass shelves, and as few chemicals as possible. This is what the dark-room must contain in order to prepare albumenized plates with any degree of certainty. Dust is the greatest enemy of this admirable process, and it is the first to be vanquished—that is why I advise a small room. The walls, ceiling, and floor are so arranged that they can be washed now and then, to take off the dust. The drying cupboard is made of varnished zinc, containing plate-glass shelves the same width as the cupboard, but an inch and a-half shorter. The first shelf touches the zinc on the right-hand side; the second shelf touches the zinc cupboard on left-hand side, and so on, alternately, to the top of the cupboard. On the right-hand side of the bottom of the cupboard is a hole, over which is soldered a piece of fine wire gauze, covered with a piece of fine linen. This hole is an inlet for air, and the fine linen acts as a filter to stop dust and dirt from entering with the air. It would be well even to dip the linen into a little glycerine, and change it now and then. On the left-hand side of the top is another hole, which forms an outlet; this is covered by a piece of sheet-iron piping, in the interior of which is placed a Bunsen burner. The prepared plates having been laid upon the glass shelves, the doors are closed. The Bunsen burner lighted, a draught is established in the chimney, and fresh air is drawn through a hole at the bottom, which passes over the surface of all the plates and dries them very quickly; if the air be very damp it can be made to pass through chloride of calcium. In fact, it can now be seen that to succeed with this process great cleanliness is required, and, above all, great care not to open doors too rapidly, or go in and out of the dark-room too frequently, so as to raise the dust. I dwell very long upon this subject, being certain that this is one of the greatest stumbling-blocks of the process.

2nd. Preparation of the albumen. Take 17 new-laid eggs (eggs a week old are the best), break them, and carefully separate the yolks from the whites; take out the germs (treadles). Weigh out 5 grammes of iodide of potassium, ¼ gramme iodine, mix therewith 500 c.c. of albumen, then pour into a large basin and whisk into a froth; this is allowed to remain twenty-four hours in a cool place to settle down; the product is then filtered throug a piece of clean linen, and is then ready for use.

3rd. Cleaning of the glass. It can be easily understood that the first conditions to obtain a pure and perfect image is to cleanse the surface of the glass from all impurities. This is done by plunging, first of all, the glass in a strong solution of potash; it is then well washed and left for a few minutes in a tray containing water slightly acidulated with nitric acid; it is then well rinsed, and wiped dry with linen towels. Take fine whiting, and with water make a thick paste, and wipe or spread it all over the glass, and allow it to dry, then rub it all off with a piece of fine linen. A few grains of talc (I mean as much as would lie upon a pin's head) are now put upon the glass, and rubbed over it in every direction with a piece of wash-leather. A badger-brush is now drawn over the surface, and the glass is ready for coating.

4th. Coating the plate is considered by all as the most difficult operation. This must be done in a room set apart for the express purpose, and free from dust. The best manner of operating is to take up, by a tube, the exact quantity of albumen required for each plate; breathe upon the glass, and let the albumen run out of the tube: take a clean glass rod and equalize it all over the surface, and then put it into the cupboard upon the levelled glass shelves, to dry in the manner as previously described. The plates thus prepared can be kept for years.

5th. Sensitizing is done in the same manner as with the collodion process. The bath is prepared as follows:—

Distilled water . . .	100 ounces
Nitrate of silver . . .	10 ,,
Glacial acetic acid . . .	10 ,,

After the plate has remained about a minute, it is taken out of the bath and plunged into a tray containing distilled water; it is then thoroughly washed in ordinary water, and then left to dry. After a time the silver bath becomes tinted through the organic matter dissolved out of the plates. This colour can be taken away by the addition to the bath of some chloride of silver or silicate of alumina (kaolin). This colouration does not exercise any bad effect, according to the opinion of several manipulators.

6th. Exposure and developing. If the plates are intended for stereoscopic transparencies, lantern slides, &c., the negative is put into a printing-frame, and the prepared glass upon it. It is then exposed to a diffused light for a few seconds, and then taken into the dark room to be developed; naturally, the camera can be employed for the same purpose. The development of these plates is long and tedious. A solution of gallic acid is made warm, and the plate plunged into it:

Distilled water	500 c.c.
Gallic acid	8 grammes
Acetate of lime	4 ,,

The plate is left in this solution until the liquid becomes cold, a few drops of a solution of silver nitrate are added, and the image makes its appearance. More nitrate will intensify rapidly.

7th. Toning glass transparencies is necessary to give them the pleasant appearance they bear. To have a beautiful purple colour they are toned in a chloride of gold bath. To procure a very agreeable sepia colour, they are plunged into a weak solution of bichloride of mercury, and then, after washing, into a chloride of gold bath.

Fix in hypo, either before or after the toning.

SPECIAL COTTON FOR MAKING PYROXYLINE.

BY PAYNE JENNINGS.[*]

Mr. L. Warnerke, during his last voyage in Russia, came across a specially prepared cotton admirably adapted for making pyroxyline. I give at his request his own words on the subject.

"It is a matter of the highest importance in the manufacture of pyroxyline to use cotton easily permeated by acids; ordinary cotton in acids or any aqueous solution is permeated only with difficulty, and for this reason can be only put in very small lamps at a time, and must be worked vigorously with the spatula. In the meantime, the conditions of the acids as regards concentration and temperature are changed, and the result is lacking in uniformity.

"To obviate this difficulty, I have been in the habit of submitting ordinary cotton to the process of boiling in alkalies, by which means silicious covering of the fibres of the cotton (or, as some persons prefer to affirm, the covering of vegetable wax) is dissolved by the alkalies, and the fibre is instantly fermented by water or acids. But the process of boiling in alkali, and subsequent washing and drying, is tedious, and disintegrates the fibres; for this reason I was very glad to discover in Russia a produce answering all the enumerated conditions ready-made, and by a process far superior to alkali treatment.

"This new produce is called, rather inappropriately, hygroscopical cotton, and is produced by the action of steam under heavy pressure and high temperature on the ordinary cotton. It is manufactured for dressing wounds, instead of charpie, which could not be produced in quantities sufficient for the requirements of the late war in the East. To show you the difference between the ordinary (best medicated cotton) and the new Russian, I dip these two pieces in the water, and you observe that while one goes instantly to the bottom, the ordinary cotton floats on the surface indefinitely. The same result is observable when this cotton is dipped in mixed acid."

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AN APPARATUS FOR VERIFYING THE COINCIDENCE OF FOCUS IN THE DARK SLIDE AND GROUND GLASS.

BY PAYNE JENNINGS.[*]

This is an apparatus I am requested by Mr. Warnerke to show to this meeting, his absence in Russia preventing him doing it personally, for verifying the ordinary dark slide. It is customary to use a wooden lath in the middle of which is placed a screw; the lath is put on the frame of the slide or ground glass, and the screw is worked till it reaches the ground glass, or a glass inserted in the dark slide. It is obvious that in the case where the slide rests upon the same support as the ground glass this process may answer; but in practice the position of the dark slide is generally regulated by the groove, into which the ground glass does not enter at all. This new apparatus gives the position of the sensitive surface referred not to two different surfaces of the ground glass and dark slide frames, but to one, viz., the camera front, and for this reason is superior; besides this, it indicates the difference (if any) in the most palpable manner. Mr. Warnerke required such instrument as this for the verification of his roller slide, the extreme nicety of its action rendering it invaluable for that purpose.

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Correspondence.

SWAN'S DRY PLATES.

Sir,—Perhaps the following facts concerning Swan's plates may interest your readers.

About three months ago I bought a batch of these plates, some of which I kept for convenience different periods after exposure, with the same result in all—the longer the time between exposure and development, the weaker the resulting negative. Two plates exposed in August I kept till the other day. The first, on development, showed no trace of an image. The second I exposed behind a negative to bright light for two seconds, and developed an over-exposed transparency without any traces of the image from the first exposure being visible. I think this may be accounted for by supposing that the water which the gelatine retains dissolves the bromine liberated on exposure, and from this solution the bromine again combines with the sub-bromide formed on exposure, reducing the plate nearly to its primitive state.

In conclusion, I must say, that when developed soon after exposure, I have succeeded well with Swan's plates, and I also think they keep well before being acted on by light.—I remain, yours obediently, G. L. Addenbrook.

Nov. 12th, 1878.

MEDALS AT THE PHOTOGRAPHIC EXHIBITION.

Sir,—In giving the medals on the 12th inst. the President said, with regard to the instantaneous photographs of Mr. Payne Jennings, "I am assured these are each printed from one negative."

The gift of a medal is matter of public interest, and I therefore think it right to call attention to the fact that the photographs in question are not printed from one negative, but have skies printed into the foregrounds from separate negatives. The assurance given to the presence was therefore incorrect. Not being myself an exhibitor, I am free to bring this subject forward.—Yours, &c.,

H. Stuart Wortley

[There must have been some misconception in assuming or affirming that the charming seascapes for which Mr. Payne Jennings received his medal were in every case printed from one negative. After a careful examination of them we were satisfied that in several instances they were each printed from one instantaneous negative, the sky and sea being manifestly in due relation produced together; whilst in others this was not so. We asked Mr. Jennings if they were all to be understood as from single negatives. He said, certainly not. Some (two, we think he said) had printed-in skies. There was no attempt to deceive in the matter.—Ed.]

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Proceedings of Societies.

South London Photographic Society.

Technical Meeting.

The Annual Technical Meeting of this Society was held on the evening of Thursday, November 14th; Mr. P. Le Neve Foster, M.A., in the chair.

After the usual introductory proceedings,

Mr. Werge exhibited some enlarged negatives and prints of great excellence. He strained thin *Rive* paper at the back of the negatives, and worked upon the paper with a stump, materially modifying, softening, and improving the effect. He also showed some results from Swan's plates taken in one second with a slow lens.

Mr. Smith, of the Sciopticon Company, showed an improved Sciopticon with a registering slide-holder to permit of slides of different sizes being placed accurately in position. He also showed Chadwick's improved arrangement for generating oxygen. This has been described and figured in these columns.

Mr. Bolas exhibited some of Mr. Pouncy's coloured carbon pictures in oil colours.

The Secretary showed an ingenious double back for dry plates invented by Mr. Penny, of Cheltenham.

Messrs. Alder and Clark showed some portraits produced by the Luxograph, an aid to the use of artificial light for portraiture.

Mr. Hemery exhibited his new automatic lock self-registering printing-frames, also a set of pictures, with combination printing of subsequent effects of various descriptions, illustrating the uses to which the new printing-frame may be applied. The pictures included a portrait in carbon, with the ordinary *entourage* familiar to Lambertypers, a church with a steeple tapering to a feather point (a very difficult task, and, being successful, a very capital example), in which clouds were printed so perfectly as to render any join imperceptible; being printed, indeed, close up to the subject in every part, without that suspicious haze one ordinarily sees in pictures all along the line of junction, so suggestive of the use of cotton wool, or even of dusters, the method usually adopted when double printing by hand is resorted to. There were also two cabinet tinted vignettes, with ornamental borders, in which three printings had been accomplished, the effect being excellent. There was also an example of printing Warwick Brookes' Academy negatives, more accurately done than is possible by the discs provided for the purpose, and which are discarded in Mr. Hemery's frames altogether. There were also included eight carte size portraits with natural backgrounds (Ford Smith's), being the portraits of two children, one position only, but each background being changed, no two pictures were alike. We learn that only one adjustment was necessary in the first instance, after which every portrait could receive a second printing by any ordinary assistant, without the chance of mistake on his part, and that at will the background could be changed without any alteration of the adjustment, and a great variety of portraits produced, as was evident from the copies shown. The eight cartes were perfect examples of the power the frames give the photographer to vary his proofs, as there can be no doubt that this variety would end only with the stock he might happen to possess of background negatives. The frames are ingenious in construction, and, it would seem at a glance, that perfect accuracy of registration must be ensured. They are, first the printer, and second the tinter, one of the latter being sufficient for possibly twenty of the former. We will deal firstly with the printer. This is a modification of the usual frame, with a double hinged lid, in the free end of which is fixed a plate with two studs attached thereto. In the frame itself is a moveable plate, termed the register plate, or mask carrier, with two holes corresponding perfectly to the studs, which, when the lid is closed, fit themselves into the holes, transfixing, as it were, the register plate. Turning now to the tinter, we find precisely the same arrangement, but in reverse, for now we find the plate in the lid of the frame, so that if, for the moment, we could conceive the parts of the two frames disjointed, we should be able to complete the lock, either with the two bodies, or with the two lids, as perfectly as now, and with the frames when closed. We now find that the bed of the tinter is capable of removal, and thus we can fix or adjust any design or effect we desire to produce for second or third printings, or of more if necessary. Thus, supposing we wish our portrait in an oval, with ornamental border, we take the moveable register plate from the printer, and adjust an oval mask to the disc already in position. The register plate is placed on the pins of the tinter, and, while there the mask is attached to it with india-rubber solution. The plate or mask carrier is now lifted off with the mask attached or hanging to it, and placed on the pins of the printer, when, on closing the lid, it is caught and held in position by two springs. The negative is then placed in position, and all is now ready for work. If, now, sensitive paper is put in, and the lid closed, the studs in the lid perforate the paper in the action of closing, and the register is at once complete. On removal of the paper, the print is placed upon the design in which the mask was fitted. This, briefly, is a description of the frames themselves, and, to some extent, of the *modus operandi*; but there are many varieties, which, when one is familiar with the working of the frame, will suggest themselves; and one suggested by the inventor himself demands a special notice. We have, thus far, described the internal economy of the frames. Let us now look at the outside. We here find an arrangement for vignetting and vignette tinting. The contrivance is simple and ingenious—so simple that the first question we could ask is, Will that really vignette? But it does, and in a most remarkably soft and satisfactory manner. The tint vignetter is an exact counterpart, and both slide in grooves up and down, so that if a head should be high or low, to accommodate itself to what is always a matter of chance. But we now proceed a step further, for not only is the tinted vignette produced with unvarying accuracy and delicacy, but an additional feature is introduced by the signature of the person portrayed. Though signed portraits have been produced photographically, they have been so only on a limited scale, chiefly for the reason that the production has always been difficult, and not always sure. The inventor does not, indeed, claim any novelty in it; but he claims the practical means of producing them with no uncertainty whatever, and with no more labour than an ordinary plain print would involve. We cannot do better than give the substance of Mr. Hemery's address to the meeting on photo-autographic portraits. After some introductory remarks, he observed that the frames introduced by Mr. Lambert were, generally speaking, clumsy, awkward, and useless; for his own part, not wishing to exclude silver printing entirely from his practice, he wished for the means of adding the ornamental border, so attractive and effective in the Lambertypes, to his silver prints, which was not possible, or, at any rate, practical, with the Lambert frames. The result was the new frames now before the meeting, and which, simple as they appeared in their perfected or matured state, had cost considerable time and thought in their construction, being the result of two years' practical working, with all the changes and improvements suggested by practice, before they were offered to the notice of the profession. One of the chief objections to the Lambert frames in question was the gelatine films on which the designs are printed, an objection equally forcible against all frames which are modifications of the "Lambert," and using the same material. These films, as is well known, absorb the moisture from the atmosphere in damp weather, and in dry weather contract to a horny condition, becoming hard and brittle, as they were previously soft and pliant; the consequence being, that a surface more resembling the troubled surface of water on a windy day was the medium from which the ornamental border was to be printed, and from which no amount of pressure would obtain a passable print. Under such circumstances he (Mr. Hemery) bethought himself of collodion skins on which to print the ornamental borders, similar to the one he now held, which he handed to the President for examination. Such a substance was admirably adapted for printer's ink, and being, as it were, waterproof, not open to the objections he considered fatal to gelatine. Another great advantage was, that the collodion skins could be fixed in optical contact with the glass on which they were mounted, becoming, in fact, a collodion negative. This was not the case with gelatine, as by no manner of means was it possible to attach them permanently to the glass. But perhaps the most important of all advantages was the readiness with which autography could become a part of the portrait, for the collodion skin could be written upon with the pen and ink as easily, and with as much freedom, as writing-paper. Hence a new power was given to the photographer for one had only to open albums to find constantly the autographs of people written on the card mounts with ordinary ink, a proceeding which, however interesting, was most inharmonious, the crude blackness of the ink killing out all the colour from the photograph itself. Here, then, was a purpose indeed, to which the new invention might be applied with the greatest effect, and on that topic much might be said, for certainly a new field might open to the photographer, that up to the present, in consequence of the many difficulties presented, had altogether been unexplored, or, if attempted, abandoned from the very nature of the constant and vexatious failures attending the effort. How greatly enhanced (Mr. Hemery continued) would portraits become by bearing the signature of the person pourtrayed. In the family circle a certain degree of affection is entertained even by the remotest members of relationship, and the sentiment of reverential love is always inspired by coming across accidentally an old letter bearing the signature of a deceased father or mother, sister, child, or brother. Apart, however, from the natural promptings of family affection, there is the still broader field afforded by those who make their mark in the contemporaneous history of the world; and the curiosity to see the lineaments would be equalled by the desire to possess the handwriting of "fortune's favourites," if the means were equally available of gratifying the wish. And, for instance, if Her Most Gracious Majesty permits her loyal subject to possess her portrait, it is not too much to think that she would also graciously permit them to have what they would perhaps prize as much—her autograph. Who would not value such an autograph as Albert Edward P., or such as could be afforded by our British statesmen from their own hands and pens. The army, the navy, the clergy, the leaders of science and art, the eminent of every profession, would each furnish names that men would be proud and eager to possess, without any degrading or fulsome homage. That being so, it seems strange that no effort has hitherto been made to bring out such a partrait as the "photo-autographic;" but, however it may have been, whether from difficulties imaginary or real, it is now, at any rate, easy of accomplishment, and, by the new "lock automatic," as certain in results as an ordinary print would be. The collodion skins are supplied to the photographers mounted on good stout paper, so that they may be handled freely and fearlessly, and offer as suitable a surface for writing upon as a sheet of writing paper. The designs are various, and a tablet is left in which the signature is made. The collodion being transferred to the glass carrier, it is obvious that no further trouble is occasioned than the tinting of the portrait occupies; and the signature being white on a delicate tint of the same colour as the portrait itself, the picture and autograph are in complete harmony, and very ornamental, real, and characteristic. The value of such a portrait can hardly be realised. As matter of family sentiment it cannot be over-estimated, but with those whose fame is cosmopolitan, and who are the common property of the world, its importance, whether living or posthumous, is beyond doubt.

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[*] Read before the South London Technical Meeting.

Mr Payne Jennings showed an instrument sent by Mr. Warnerke for ascertaining when the ground glass of the camera and sensitive plate were in the same plane. He also showed some cotton wool prepared to facilitate filtering (see page 561).

Mr. Cowan showed the working of his electric shutter, and also exhibited an exceedingly ingenious and convenient arrangement of enlarging camera.

Mr. Baynham Jones showed a curious example of "fringing" on a gelatine plate.

Mr. F. York showed a convenient glass cleaning desk made by Mr. Oakley, and also some examples of coloured varnish, made with dragon's blood and with "black-boy gum," for making non-actinic glass. A new printing frame invented by Mr. Lang was also shown.

Mr. Avery showed backgrounds made of the new *opaque cloth*.

Mr. Ayres showed an ingenious arrangement for cutting up albumenized paper. It consists of a block of wood presenting the end grain, to avoid chips in cutting through the papers. There were convenient measuring guages for all sizes, arranged to cut up a sheet into required sizes without waste. He also exhibited a convenient collodion pourer like a tin-pot with perforated funnel for filtering the liquid poured back.

Some glass wool for filtering purposes was exhibited.

Mr. Wm. Brooks had several interesting exhibits, amongst which were some reproduced negatives undistinguishable from the originals, and some photographs of rubbings from monumental brasses.

The proceedings concluded with an exhibition of slides printed by the Woodbury process, and shown by means of the Sciopticon.

Our report, it will be seen, consists in many instances of little more than a catalogue of exhibits, as the ingenious novelties shown would require an elaborate description from the inventor to make their aim and value clear, a casual examination during the meeting being insuffIcent to enable a reporter to give a detailed account of all the ingenious contrivances shown.

The annual dinner of the South London Photographic Society took place at the Cafe Royal, Regent Street. The chair was occupied by the President, the Rev. F. F. Statham, and the vice-chair by Mr. Mawdsley.

After a capital dinner, admirably served, the usual loyal toasts were duly honoured. and the Chairman then gave "Success to the South London Photographic Society." He observed that the Society had now been established for nineteen years, and the fact that it now comprised upwards of seventy members was in itself a sufficient justification for its existence. What were the precise features of the Society which distinguished it from others? Well, for his own part, he considered that its chief characteristics lay in the encouragement it gave to amateurs and to the younger members to pursue their study of the art of photography. It did not, like the Parent Society—the Society of Great Britain—attract all that was foremost in science, but it acted, as it were, as a sort of feeder to that Society, and, as a matter of fact, not a few who had made a name for themselves in the Parent Society had once been fostered and encouraged by the assistance they had received from the South London Photographic Society. Indeed, the other Society seemed to look upon them with envious eyes, and enticed their members away. There was their excellent secretary, for instance. He understood that there was a prospect of Mr. Cocking severing his official connection with the South London Society; and, in referring to this subject, he could only say that he believed that the success of the Society during the last nine or ten years had been due to the energy and labours of that gentleman. However, he believed the duties would henceforth devolve upon Mr. Cocking jun., and he thought that the vitality of the Society would in no wise be impaired. He hoped that the members would do all they could to support the Society by attending punctually at the meetings, and he concluded by coupling the name of Mr. Edwin Cocking with the toast.

Mr. Edwin Cocking, in reply, said that if they took the experience of the past as their guide, he believed there would be no fear as to the future. He believed that the Society had of late succeeded in supplying a want long felt. Encouragement and facilities were given for the discussion of matters relating to science and art, but there had been hitherto no opportunity for the discussion of matters exclusively commercial. This had now been met, and he thought that the technical meetings of the Society had in this sense been of the highest value. With regard to the members of the Society, he often thought that young members, when they came to the meetings, were somewhat frightened, from a notion that they were expected to do something. This was a mistake, as all that was required of them was to throw aside old prejudices, and learn something from the experience of others. He thought that great good had been done by their conversational meetings and by their technical meetings, while the papers read were often of the greatest benefit; although he might remark, in passing, that he was more in favour of short papers being read than long ones. It was a singular fact that the Society did not seem to increase nor decrease in numbers. During the fourteen years that he had been a member of the Society, there had been an average of some seventy members; but at the present time there were but seven or eight who were members when he joined it. This fact, at all events, showed that, with the constant change of members, a large number must be passed through the grindstone of the Society. He might say, with reference to himself, that he had now been associated eleven years with the Society; but this was the last time he should appear before them at the annual gathering in his present position. He could only say that his labours had been to him labours of love; and though his interest in the Society was in no way abated, he had considered it expedient to withdraw. He should, however, continue to interest himself in the Society, and hoped to receive as much pleasure from it in the future as in the past.

Mr. Pearsall, in proposing the toast of "Photography," referred to the value the art had proved in various ways to science. In physiology, for instance, an immense light had been thrown upon the action of the eye, and the act of vision, by means of photography. It was now believed that the action of the eye was partly mechanical, and partly chemical; and some had gone so far as to assert that there were colours produced on the retina of the eye, and that it was possible, as Professor Gamgee had done, to eliminate these colours. If this were true, we should have something like a key to the operations of life, in addition to solving the problem of colour blindness. With regard to art photography, he must say that, after carefully examining the magnificent collection at the French Exhibition, he could not allow that English photographers had in any way been beaten. Coming home he had visited the Exhibition of the Photographic Society, and had felt greatly pleased at what he had seen, his wish being that that one room could have been shown side by side with the collection at Paris, as a specimen of what Englishmen were capable of producing in the way of landscape photography. At Paris he had asked a friend whether he thought English landscape photography was better or inferior to foreign landscape photography; and the reply was, "Better, decidedly better." The reason, he (Mr. Pearsall) thought, was, that in England there was a better atmosphere, that is to say, there was a larger amount of air ever present. After a reference to the technical meeting of the South London Society, which, he thought, was of great use, Mr. Pearsall alluded to the greater attention which was now being paid to photography as a method of education, and thought the fact that the Society of Arts had included it as one of their subjects was a great step in advance. It was also an important part which photography played in the copying of writings. He had heard that the things which the North American Indians valued most were copies of the *Illustrated London News*, as it gave them some idea of what people and objects were like in England; and if this were so, would it not be also the case, but to a greater extent, with photography?

Mr. Payne Jennings, whose name was coupled with the toast, responded. He said it had always been his firm conviction that a great future was before photography in an artistic direction. Technically, it had been brought to a great perfection, and little more remained to be done. But there was yet much to learn, so far as art was concerned; and, therefore, he would urge upon photographers to study to produce artistic work, to endeavour to find out how the great masters of art produced their effects, and to increase their art knowledge in every way possible. Dry plate work, he considered, had assisted photographers greatly in this direction. He did not say that the wet could not do as well, but there was the drawback of the cumbrous apparatus, and the consequent want of readiness; whereas, on the other hand, with half a dozen dry plates (for he did not believe in a changing box), one could get effects before they had time to vanish, a thing impossible by any other means.

The Chairman then proposed the toast of the press, responded to by Mr. G. Wharton Simpson, Mr. William Sawyer, and Mr. C. Pearce. Mr. Hemery responded for the Visitors, and the Chairman then gave the health of the Vice-Chairman.

Mr. **Mawdsley**, in reply, referred to the rapid strides which dry plate work had made of late years, and concluded by proposing the health of the Chairman, with which the list of toasts terminated.

Several songs were contributed by Mr. F. A. Bridge, Mr. York Jun., Mr. C. Pearce, Mr. Brooks, &c., and assisted towards forming a very pleasant evening.

Talk in the Studio.

Amateur Photographic Association.—The prizes awarded at the last Council meeting—consisting of three silver goblets, two elegant albums, and six oil paintings—may now be seen at 12, York Place, Baker Street, and will remain on view until the end of next week.

A Fatal Fall.—*San Francisco, November* 2.—W. H. Rulofson, President of the National Photographic Association, and of the firm of Bradley and Rulofson, photographers, fell from the roof of the three-story building in which his gallery is located, corner of Montgomery and Commercial Streets, this afternoon, receiving injuries of which he died half an hour later.

Dangers from Impure Potassium Iodide.—It appears, from a discussion which took place recently at a meeting of the Society of Medical and Natural Sciences, at Brussels, that the greatest danger accompanies the administration of iodide of patassium containing a minute proportion of the iodate. Dr. Melsens, the learned Professor of Chemistry at the Veterinary School, in support of this statement, detailed some experiments with dogs, in which these animals had rapidly succumbed after injection of iodide of potassium containing a mere trace of iodate. The question now to be solved is whether the iodate of potassium itself is a salt possessing such marked toxic properties, or whether its presence give rise to a minute quantity of free iodine in contact with the blood. At all events, it is a subject that will undoubtedly attract a good deal of attention, and points an once to the absolute necessity of having for pharmaceutical use nothing but iodide of potassium that is chemically pure.—*Scientific American.* [It is of scarcely less importance that this salt should be pure for photographic purposes.—Ed. P. N.]

To Correspondents.

⁂ **The Year-Book of Photography for 1879.**—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue, we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

S. James.—We presume they would be published in full, or in brief in the *Comptes Rendus* of the Academy; but we have no personal knowledge of the matter.

F. S. C. (Adelaide).—We have no reason to believe that the electric light is much employed in Europe for copying, or other photographic purposes. Mr. Vanderwade has used it successfully for portraiture, allowing it to pass a large Fresnel's droptric lens; it might possibly be used in the same manner for copying; otherwise it seems to us especially unsuited for copying purposes, as it would tend to exaggerate the texture of the surface of the picture to be copied.

W. B.—We do not know of any method of turning a knowledge of photography to commercial account, except commencing business or accepting a position as assistant. To secure the latter position, advertise your necessities in our business columns.

C. E. Pryke.—Much will depend on the mode in which the dry plates have been prepared. Treating an exposed dry plate with a solution of an iodide or bromide will remove the effect produced by the action of light. Dealing with bromide of silver emulsion plates, Captain Abney, who has given much attention to the subject, says in his book on Emulsion Processes: "Plates which fog through having been exposed to light may be rendered ready for exposure by washing off any preservative they may have on them, and immersing them in a hock-coloured solution of potassium bichromate, or by water faintly tinged with potassium permanganate, or with one-tenth per cent. solution of hydroxyl in water." After washing, a preservative may again be applied. 2. We do not know of any work devoted especially to landscape photography

T. S.—The book on Carving and Gilding to which we have often made reference is published by Kent and Co., Paternoster Row. Your other question is purely a legal one, upon which you should consult a solicitor. But, so far as we know, you may commence business under any name, or number of names, you may choose. Whether it is wise to do so, we cannot, without knowing all the circumstances, offer an opinion upon.

Ignoramus.—"Parts" in a formula may consist of grains, drachms, ounces, or anything you like, so long as you take a definite value for each. In the formula in question, grains would constitute convenient parts, using grains by weight for solids, and minims (the equivalent of grains) for liquids. Thus 1,000 parts of water in grains would be two measured ounces and 40 minims; 60 parts of iron salt would be a drachm, the copper solution would be 1 scruple or 20 minims. We should take the honey by weight. You will see that the matter is simple and certain enough.

R. H. B.—As a rule, the use of dilute acids and a high temperature gives pyroxyline easily soluble in large proportion, and the film is powdery and free from toughness. Strong acids produce the contrary effect. The pyroxyline is only slightly soluble, and gives a tough and glutinous collodion. We should call 180° Fah. a high temperature, and 100° a low temperature.

Printer.—It is a wise thing in winter to mix the hyposulphite for fixing solution in warm water. A very cold fixing solution is apt to cause imperfect fixation. Hyposulphite of soda in the act of dissolving considerably lowers the temperature of the water. 2. The best mode of making a toning-bath for immediate use is to take of concentrated chloride of gold solution, containing one grain of the gold salt, and mix it to a cream or paste, with prepared chalk; then pour on ten ounces of hot water; let it stand until cool, and it will be ready to use.

Portraitist.—Both instruments appear to us to be very efficient. We cannot undertake to decide which is best.

Artist.—The coloured photographs exhibited by Lombardi and Co. are by a patent process. In what especial point the patent consists we do not yet know. The principle of making a photographic print transparent, and colouring at the back, is open to any one to practise. It has been patented over and over again; but there is no patent at present which can cover it, as it has long since been published. If well done, the effect is admirable. Those exhibited by Lombardi and Co. were very fine.

A Subscriber is under an erroneous impression in supposing that we have necessarily any knowledge of, or, in any case, any responsiblity for, persons advertising in our colums. Or, in supposing that because we chance to know slightly anyone, that we can have or give any information as to their business management. We have understood that the gentleman to whom you refer has been from home, out of London, the last few months; but we know nothing of his business arrangements. It is more than twelve months since we saw him.

W. H. M.—If you have tried several matt varnishes without obtaining a satisfactory result, you should have stated what these are, as we may probably only repeat those you have tried. A little turpentine added to spirit varnish, and applied cold, or with little heat, sometimes answers well. Mastic, or sandarac dissolved in a mixture of ether and benzole, gives a good result. Proportions to be ascertained by trial.

W. J. Anckorn.—Many thanks.

Several Correspondents in our next.

The Photographic News, November 29, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Cloud Photographs as Weather-Warnings and Storm-Signals—Carbon Printing in Cold Weather.

Cloud Photographs as Weather-Warnings and Storm-Signals.—The Meteorological Society of London have been discussing the question of cloud formations in relation to storm-signals and weather warnings, and have had before them a series of diagrams illustrative of various phases of the weather. The diagrams, unfortunately, were not photographs, and although, doubtless, very carefully prepared, could not carry conviction with them to the extent that pictures secured from nature would have done. It seems strange that meteorologists should be so long taking up the subject of cloud foretellings. Most of us, who have never studied formations in the sky, know a storm cloud when we see it, and can predict with pretty good certainty the advent of wind. Under such circumstances it is evident that a closer study of these phenomena would repay the attention of meteorologists, and the Astronomer-Royal of Scotland, Professor Piazzi Smyth, has time after time urged the taking of photographic records of clouds. The hoisting of storm signals on the coast is usually undertaken by intelligent men, who, if they act under orders, are quite capable of themselves taking rough observations, and it may be fairly assumed that if these men—coastguardmen, and the like—were furnished with photographic pictures of the cloud, with a key to show what the formations indicate, these subordinates would, in a short time, become expert observers. Nothing is so easy as to depict cloud photographs to those who have had experience in the matter, and the fact that the pictures can be taken instantaneously must add to their value as scientific registers. If it were necessary, the cloud pictures could be enlarged to enormous dimensions, and in this way details of the phenomenon brought out which at first are but imperfectly seen. A series of views taken at proper times by skilful observers at Greenwich, or Kew, or elsewhere, might be formed in the first place, and these afterwards supplemented by observers throughout the country, of which there are a large number. The cloud diagrams, with their teachings, might be forwarded to a centre (say to the Astronomer-Royal or to the Meteorological Society), and, after a time, a series of types might be chosen, to serve as a weather-guide. There cannot be a doubt as to clouds giving us a truthful indication of what the weather is to be, and it is to be doubted, indeed, whether a forecast can be constructed upon more trustworthy data. At any rate, most meteorologists are agreed upon the desirability of studying cloud formations, and we hold there is no better method of doing so than with the aid of the camera.

Carbon Printing in Cold Weather.—Winter is pre-eminently the time for carbon printing. That terrible evil—reticulation—is rarely to be found in cold weather, and the tissue does not become dry and chippy, as is the case in summer weather. Indeed, those who have been compelled to throw up carbon printing by reason of the irregularity of results would do well, in the event of their being disposed to give the matter another trial, to take up the tissue during the cool season. For not only is the tissue more regular in its consistence, because of the amount of moisture it contains being pretty constant, but from the fact that bichromate printing is more rapid than silver, there is naturally a gain in having recourse to carbon during the short winter days. There can be little doubt that the amount of moisture it contains has a good deal to do with the behaviour of the tissue, both in the printing-frame and in the developing tank, and probably if the percentage were kept to a uniform degree, half the difficulties in carbon printing would disappear. Unfortunately gelatine, useful material that it is, is as changeable as the moon. You cannot prevent it from absorbing moisture in a damp atmosphere, any more than you can stand in the way of its parting with the water it contains in dry weather. But one thing is certain: the bichromated gelatine is better for the photographer's use when it is in tough flexible condition, than when it is dry and cracky. It is no use letting the latter, after printing, soak in the cold water for an unusually long time; the mischief is done, and cannot then be remedied. The moisture should be restored to the tissue before it is printed—by storage in a cold damp cellar, for instance. In fact, in the summer time, it is difficult to get on at all with carbon printing, unless provided with a dark cold storage room. In winter time, however, this ceases to be necessary, and carbon printing usually goes on apace without difficulty. The tissue does not vary so much in sensitiveness, neither in solubility. There is no need, as upon hot summer days is occasionally the case, to bring the developing water up to 140° and 150° F., and actually to rub the surface of the tissue with one's hand. Until June comes again the carbon printer will be pretty safe, and may rely upon his tissue containing a due amount of moisture, and being readily soluble, while reticulation should certainly not make its appearance unless the sensitized material is very stale. As we have once before said in these columns, a tissue which shows signs of reticulation on glass may very often be perfectly developed upon zinc or other metal, provided the phenomenon has not gone too far. The chilling in the latter case seems to bring back the tissue to its normal condition; but then, unfortunately, you cannot get such fine work as upon glass, even if you take the trouble to collodionize your zinc before development. For enlargements, carbon has attained to a position from which it can never be displaced; and for this reason, if for no other, photographers of to-day have no choice but to learn something of the process. Many we know who have essayed to do their general work in carbon have been compelled, if only for a while, to desist, and go back to silver; but their experience must have taught them that the introduction of permanent printing is only a question of time, and nothing else. Transparencies can be secured by no other means so readily and perfectly as by the carbon process, and for enlarging, the tissue is simply invaluable. Therefore, to those who are thinking of giving carbon printing a trial, as well as to the others who have temporarily put the process on one side, we say, begin in the cold months, for then the difficulties are fewer, and the chances of success much greater. Use your tissue as soon after sensitizing as possible, and do not develop in warmer water than is necessary. Develop to the utmost, so that there shall be no signs of "running" afterwards, which renders the picture unsharp, and gives it a washy appearance. That carbon printing is not to be learnt in a day no one will expect, and, unfortunately, there are times—very rare, fortunately—when, from the circumstance of the gelatine becoming chemically changed, the most experienced carbon printer is at a loss to set matters right. Therefore, let not beginners be discouraged. In the case of experienced photographers, carbon printing under ordinary circumstances presents but few difficulties; but there are some, nevertheless, which puzzle the oldest hands at pigment printing, and which apparently promise to puzzle them yet for some time to come.

PHOTOGRAPHIC NOTES FROM A TRAVEL IN RUSSIA, WITH EXHIBITION OF VARIOUS WORKS, APPARATUS, AND MATERIALS.

BY LEON WARNERKE.*

Six winter months I spent in Russia, and now I intend to communicate to you a few notes regarding my travels. Before, however, I proceed any further, permit me to assure you that I had nothing to do either with Plevna, or with the Treaty of San Stephano. My notes are purely photographic, and therefore I hope I shall not encroach, either on the British interest, or on the rules of this Society. It was my good fortune that although I arrived a perfect stranger in St. Petersburg, I very soon made very valuable acquaintances among persons connected with science and photography, and, thanks to friendly relations that followed our first acquaintance, I have been able to see a great deal, to learn much, and to bring over with me that rich and numerous collection, a part of which is exhibited in this room.

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* Read before the Photographic Society of Great Britain.

You will not be surprised to hear that photography in Russia is very well represented. In certain branches it occupies a foremost position, and there is sufficient originality to authorise me to state that there is in the collection before you a great deal quite novel, deserving more than a passing glance.

Most remarkably cultivated is undoubtedly the portraiture, and in this branch very high excellence is attained. There are many reasons that contributed to this perfection, but most prominent is the artistic culture of the photographers, many of the best known names having attained a high degree of proficiency as painters before they embraced the new art. At the time of my arrival at St. Petersburg there was no Photographic Society, and no special publication devoted to photography; but several gentlemen belonging to various scientific bodies occasionally touched upon photographic problems, and made them objects of special investigation. For want of time it will be impossible for me to enter at present into the details of these investigations. I simply enumerate the names of authors and subjects of study, intending in some other place to give a full account:—W. Lermantoff, Professor attached to the St. Petersburg University, investigated the theory of the formation of the photographic image obtained by development, and explained it by galvano-plastic action. Interesting is the experiment in support of his theory. A small funnel made in parchment is filled with a negative silver bath, and inserted in the ordinary iron developer. Silver wire in the shape of a horse-shoe is then inserted in such a manner that one end of it is dipped in silver and the other in iron. After some time crystals of metallic silver are formed on the end dipped in the liquid contained in the funnel.

N. Egoroff, Professor of the same University, studied the action of the electrical photometer based on the principle discovered by E. Becquerel, that if two silver plates covered with iodide of silver be dipped in a weak solution of sulphuric acid, one kept in the darkness, and the other exposed to a beam of light, the galvanic current will be formed, the intensity of which is proportionate to the intensity of light.

E. Kotelnikoff explained the theory of the formation of the photographic image (negative) by phosphorescence, asserting that iodide of silver, by short action of light in the camera, became phosphorescent with ultra violet light, and this light ultimately produced precipitation of silver in the mixture of silver and iron salts when the developer is applied. H. Wild introduced in the Physical Observatory in St. Petersburg quite an original instrument, named Uranophotometer, to determine daily the intensity of diffused light of the sky, based on the theory of polarization.

I have in my possession the publications mentioned, and anybody wishing to make nearer acquaintance with them is quite welcome.

During my stay in Russia I had the pleasure to witness the organization of a new Photographic Society. Existing laws of the country put many difficulties in the way of formation of any society; but, fortunately, in Russia there exists at present a very influential and powerful institution, named the Imperial Technical Society; I shall not be very far off from the truth if I compare it to the Society of Arts combined with the Kensington Museum.

The Society, through its enlightened and highly esteemed president, P. Kotchoubey, and secretary, T. Lwoff, offered to the new applicants to accept them as a section of the Technical Society. This arrangement obtained high sanction, and the new Photographic Society is at present on the way to probable success.

The President elected is Lietenant-General Birkin; Vice-President, General Tchagin; Secretary, W. Sreznewski; Committe: Lewitzki, Denier, Klassen, Lapteff, Shpakowsky, Lorens.

It was not decided whether the new Society would issue a journal, but Professor Wagner, a distinguished editor of a magazine "Swet (Light)," recently issued monthly supplements under the title "Swetopis" (Photography), the first few numbers of which I now forward to the library of this Society.

Since January last appeared also a new bi-weekly magazine, "Obzor Graphitzeskich Iskustw" (Review of the Graphical Arts), giving considerable room to photography, and even adorned with specimens of this art.

Photography is largely adopted by many Government establishments for the reproduction of maps and of State Papers. Perhaps the largest institution of this kind in the world is the well-appointed photographic establishment under the superintendence of G. Skamoni, who is so well known in the photographic world. Every branch of photography is worked successfully in this establishment, as you can observe by the specimens kindly given to me by Mr. Skamoni, and exhibited on the screens. But most original and characteristic are those heliogravures produced by the process described in his book, and presenting the same excellence as the world-famed heliogravures published by Goupil et Cie, in Paris. Mr. Skamoni's assistant, Mr. Chesterman, is an Englishman. I cannot leave the establishment without taking note of how closely allied with photography is the art of galvanoplasty—in this establishment iron is electro-deposited to any thickness, and by this means letter-press blocks are produced that are able to give millions of impressions without being worn out, a requisite for the impression of rouble notes, so largely circulated in the country. I exhibit a fine specimen of an electro-deposited iron presented to me by Mr. Skamoni.

By the same process old armour, of which excellent specimens are now being exhibited in Paris, are reproduced, quite equal to the original.

Another very important Government photographic establishment is in the Depot of the General Staff, under the able and enlightened direction of M. Laptef, chief of Depot of Maps. General Shtupendorff is himself an accomplished photographer also, and this contributes to the general success of this very busy and well-organized institution. Photo-lithography is his principal business. This huge map of the Austro-Prusso-Russian frontier, published for the present war, is certainly a very remarkable specimen of photo-lithography. However, the most remarkable production of Mr. Laptef is illustrated by this incomparable map, printed by copper-plate, and produced by electro-deposition on gelatine relief. Numerous specimens, not only of prints, but also of negatives used in this establishment, will enable you to estimate fully the excellence and importance of the establishment.

Photography is called in aid by two profusely illustrated periodicals in the shape of photo-zincography, which is used for the reproduction of wood-cuts published in other countries (copyright in Russia has no effect), but those are generally very inferior. Among the private establishments that print from gelatine (Alberttype) the most remarkable is that of W. Reinhardt's. Among numerous specimens done by this gentleman, I point your special attention to this rare manuscript, produced by the joint labour of himself and M. Sreznewsky, who, being an amateur photographer and learned searcher after vestiges of old civilization in his country, took all negatives from this unique manuscript, while Mr. Reinhardt, who printed it by photo-lithography, produced according to his system the transfers by Albert-type. Here are autographs of Peter the Great and Catharine II., and the first book in the Slavonic language printed in Crakow.

I have not many specimens of portraits in my collection; these you have often opportunity to see at our own and other exhibitions. But I wish to point your special attention to the production of M. Denier. This gentleman uses quite an original system of his own. His work, as you can judge by these specimens, is recognized among all others by its extreme delicacy, comparable to ivory or opal. Strictly, no retouching, either on the negative or on the prints, is used. His studio is remarkable for noble proportions, and by total absence of blinds or curtains. He uses collodion especially prepared by himself, and gives very short exposure.

Mr. Lewitzky, whose universal reputation was established long ago in Paris and St. Petersburg, is not sleeping on his laurels. In his studio special attention is paid to every novelty that appears in photography; you can find there every new appliance, and every process is investigated. He is the only licencee of Lambert and the Autotype Company in Russia, and his productions are worthy of close examination. I only regret that they are not more numerous.

Many other very remarkable portrait photographers are well known in St. Petersburg, such as Lorens, Bergamasco (the last most successful commercially), and others; but it happens that my collection is lacking in their works.

Next we approach the very numerous studies of Russian life in endless variety. Only attentive perusal of this very extensive series will initiate the inquiring examiner in the outside appearance and general character of the country and its people. The author of this marvellously well-executed collection is an Englishman, Mr. Carrick, who, when presenting to me his magnificent gift, imposed only one obligation, that, whenever I showed any one the result of his labour and artistic genius, I must couple with his the name of the late Mr. MacGregor, who was his assistant, and became his instructor and best friend till his lamented death, which occurred several years ago. Almost every photograph is a picture of great artistic value.

These fine views of St. Petersburg and Peterhoff are the work of Mr. Felish, who makes street views his speciality, and, by systematic work, attained the excellence you can admire without being tired by their great number.

The interior of the prison acquired special interest, in consequence of the last attempt on the life of the Governor Trepoff.

This unsurpassed series of the interiors of the Imperial palaces is the work of Mr. Classen. This is undoubtedly the finest result ever produced; but the reason of this excellence is not difficult to understand, since he possesses artistic and technical qualifications, coupled with real love of the art and extensive practice. Mr. Classen, like Mr. Denier, does not use blinds or curtains in his studio. This extraordinary panorama of St. Petersburg is also his work.

The next series are the works of Mr. Karelin. You have heard a great deal of discussion respecting these pictures from the time of the last Edinburgh Exhibition. I was so struck by them, that, without necessity, I went to Nizny Novgorod to pay a visit to this gentleman. The trouble of the long journey was repaid by the cordial reception I received in Mr. Karelin's house, and by the pleasure of seeing a large number of far more important works than these. Unfortunately some very fine specimens have not yet arrived.

Mr. Karelin has discovered means to introduce an alteration in portrait lenses which enables him to obtain extraordinary depth of focus without any loss of rapidity. This you can especially observe in the groups I point out to you. But what strikes every observer is, that a great many of these photographs are illuminated by direct sunlight, and, notwithstanding this, they are models of softness. These groups are taken inside the room. I recollect all the fixtures of this rather low and not very light room. I mention this peculiarity for the information of some persons who suppose that these are combination prints. I have also examined the negatives.

Mr. Boldyreff, whose photographs hang on this side, says that he hit upon the same idea as Mr. Karelin. Certainly, some of his pictures approach in beauty those of Mr. Karelin. Quite recently also I received information from a friend in St Petersburg, who has also done the same. It is possible that we shall soon be obliged to alter our photographic outfit for landscape work, and only be satisfied with instantaneous work.

This apparatus is the work of an amateur professor in Moscow, Uzutzewsky. It contains a dozen sensitive plates, which are exposed without the aid of a dark slide. It also reminds one of Jontè's camera, but is much simpler, and has other advantages. The same gentleman has invented a very clever portable stand for a camera, which I hope to be able to show on some other occasion.

The indefatigable Secretary to the new Society, Mr. Sreznewski, has also constructed a very ingenious box-tent.

I introduce next to you a very good apparatus, made in Moscow, to verify the correctness of the position of the ground glass in the camera.

Among material useful in photography, I can only show you at present, in consequence of the shortness of time, this cotton, which is very suitable for making pyroxyline. It is prepared as a substitute for lint, and was used in the late war. Its peculiar property is its permeability by water, a quality very desirable in the manufacture of pyroxyline. The process used to obtain this quality is not well known, but I heard from a good authority that it is the treatment of the cotton by steam at a very high temperature, and under heavy pressure.

I close my notes by publicly expressing my gratitude to those gentlemen who, by their generosity, have enabled me to-night to illustrate my paper by these numerous collections.

PHOTOGRAPHY IN CYPRUS.*

BY J. THOMPSON, F.R.G.S.

Mr. Thompson explained that he had just returned from a visit to Cyprus, bringing with him a number of interesting photographs, which he had lent to the Society for exhibition, then gave a brief *resume* of the particulars of his tour. His object in visiting Cyprus, he observed, was twofold. First, to obtain a series of photographs which would convey some idea of the place and the people; and secondly, to procure such information as would be valuable towards the same end. He took the overland route from Paris to Marseilles, and from Marseilles to Alexandria, his only difficulty being with the quantity of baggage he had with him, an item which he advised every one who contemplated journeying to Cyprus to reduce to as small a dimension as possible. On approaching Larnaca, the view struck him as one of the finest in that part of the East. The whole coast of Cyprus could be distinctly seen in the foreground, while in the distance beyond were mountain ranges, which, on looking at with a photographic eye, he could not help thinking denoted much trouble in store. Over these mountain ranges was hanging a haze caused by the heat, and this haze was not at all easy to overcome, so as to give a true idea of the landscape. This heat and haze prevailed in Cyprus during the summer months, and increased as the rainy season approached The latter season had not yet come on, although it had been expected for some time. The beauty of the view somewhat disappeared in getting nearer to Larnaca, when the visitor saw nothing before him but a Turkish town like many others in Asia Minor or the Levant. Larnaca was a collection of dilapidated homes, relieved by spires, towers, and minarets, and at first sight the appearance was dreary and depressing in the extreme. There were scarcely any landing places, and altogether the town was just what might be expected after some three or four hundred years of Turkish neglect and misgovernment. Larnaca was certainly not inviting with its tumble-down houses and its dilapidated, groggy-looking piers standing up in the water, very fine indeed for pictorial purposes, but of not much use for anything else. There was but one English hotel in Cyprus, and making his way thither Mr. Thompson found there a number of disconsolate Englishmen, whose only occupation, apparently, was asking each other after their health, whether they had had fever, whether they liked the place, how long they were going to stay, when they were going back, why they had come to such a place, and altogether the reception was rather dispiriting. As he had not got quite rid of the effects of the sea, he was at first half inclined to return at once; however, he did not do this, and afterwards found that his first impressions had to be considerably modified. Larnaca was but one place, and he fancied that a good many of the impressions which had been brought to England were only derived from them. The difficulties of photography in Cyprus were very great; there were no roads to speak of in the island. The only roads, in fact, were one which crossed the island to Nicosia in the centre, and then extended to the mountain ranges at Kyrenia, and one from Larnaca to Famagusta; all other roads were simply footpaths. There was but one omnibus in the island, and Mr. Thompson had thought of travelling by it to Nicosia, but afterwards found that it was very small, and did not take baggage. The mode of travelling was by mules, camels, and donkeys, and he decided to hire mules for the purpose. The baggage mule was a very small animal, and when the apparatus was piled on to his back he was almost invisible. The muleteer was a very tall man—indeed, the Cypriotes were as a whole a splendid set of fellows, the majority being six feet high—and when the mule was packed he deposited himself on the top of the baggage. Mr. Thomson's apparatus consisted of one of Rouch's tents, as small a quantity of chemicals as he could carry for the wet process, some collodion emulsion for the dry, and a small portmanteau of supplies. Thus equipped, he started for Nicosia, the capital, which lies in a plain between two ranges of mountains. Before reaching Nicosia Mr. Thomson stopped for a night at Athenis, a village peopled by muleteers, who showed him great hospitality, and this was his experience throughout the island. No payment was ever expected for lodgings, and all that was necessary was to make a present to the servants or the children. At Kyrenia he employed a dragoman, an Arab shopkeeper, and a very intelligent man, speaking four or five different languages. As business was bad, he gave up his shop for a time, and engaged himself to Mr. Thomson for twelve shillings a day. The dragoman was supposed to know every part of the island, but this turned out incorrect, and Mr. Thomson found him on several occasions to be useless as a guide. Indeed, the dragoman had an important object in joining Mr. Thomson, which was to call upon his customers in the different towns, and remind them of the stock of maccaroni, soap, and matches he had got in his store at home. However, on the whole, he managed to attend to Mr. Thomson's affairs and his own pretty well, making himself useful in cleaning glasses, setting up the tent, &c. With regard to the health of the island, Mr. Thomson remarked, in passing, that it was not nearly so bad as had been reported. The inhabitants in the interior were a fine race of people, there was very little sickness, and no physicians. When anybody was ill, say a headache, he made a model of his head, not very artistic, perhaps, but near enough, and deposited it in the church before some saint as a votive offering, so that the saint might be reminded of the cure which was desired. The Cyprus fever was not a very dangerous one; he (Mr. Thomson) had rather a bad attack, but he pulled through it in about a week. His worst photographic experience was when ascending Mount Olympus. He rose very early for the purpose, and found the morning very gloomy and threatening. However, about five o'clock he determined to start despite the great masses of clouds gathering up. The dragoman and the chief at whose house he was staying both prophesied rain, but as he said he should have no other opportunity, they at last started to ascend the mountain. When the summit was reached, the rain came down as it only could in these latitudes, and by the time they had set foot on the ancient shrine which crowned the height, the hills shook with thunder and the lightning flashed, the whole forming one of the most terrible storms he had ever been in. However, the tent was erected, and the chief, who was clad in an enormous fur greatcoat, took shelter under it, while the muleteer took refuge under the saddle-bags. However, in spite of all the difficulty, he succeeded in bagging one photograph, and then the party prepared to depart; the chief, owing to the pools of water which had gathered in his huge greatcoat, being with some difficulty dragged from beneath the tent. Mr. Thomson then gave an amusing account of his descent of the mountain, and concluded by expressing his willingness to give any information to any one who wished in reference to his method of working in so hot a climate.

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* Communicated to the Photographic Society of Great Britain.

SKY LIGHTS AND RAPID PROCESSES.*

The rage for the present is for rapidity. A process is nothing if not rapid. Now, by process let it be understood that a certain formula for collodion, nitrate bath, developer, continuator (a new term, but more appropriate than re-developer, so commonly used) and intensifier, is meant.

Lightning and quick process are nothing new. Twenty years ago we paid a traveling process-vender fifty dollars for a new French instantaneous process, the whole secret of which, if our memory serve us correctly, was a sixty-grain nitrate bath *exactly neutral*, and used at 90° Fah. Now this bath was an impossibility, as every plate dipped changed it so. After innumerable failures we gave it up, and kept on with a slightly acid bath, and exposure varying from one to three seconds for children, and fifteen to thirty for adults. As a general rule, of course, very poor, weak, light, or very large heads, and small diaphragms required, longer time; but while our neighbours were giving two and even three minutes occasionally, we seldom found it necessary to give more than one minute.

You ask wherein lay the secret of our short exposure. Well, we propose to tell you as concisely as possible.

We always had plenty of light to work with. There, now, brother photos., there it is. How do you like it?

We are told that Rembrandt adopted his style of lighting because when he began painting he had only a small low garret window to work by, so small that the light diverged upon the subject, lighting it up as from a lamp. His paintings were different from the work of other artists, and their merits brought them and him into notice. Many photos. seem to think that the less light they can work with, the better. So they fit up studios with skylights from five feet by seven upwards, and often twelve or more feet from the sitter. Now we submit that this is contrary to common sense, yet such artists will reason learnedly that no man can make *good* work, *artistic* work, with a flood of light; that the best painters use but little light, &c., &c. Could such persons see the beautiful Lichtdruck prints sent us from Munich, made by Herr Obernetter out in the garden, they would be compelled to admit that good pictures can be made where the light was unlimited.

We were putting in a new skylight some twenty years ago. A famous artist called to see us, and we showed him our new rooms then fitting up. His first exclamation was, "Too much light, sir! too much light! Our artists are going mad for huge lights. Why, sir, the best picture I ever had taken, I set between the camera and the light, turned so that the light just touched the nose and right cheek. It's true I can't sell such pictures, but we must educate the vulgar herd up to the point of taking *our* style of picture. I tell you again, your light is too large; too large by half." Now, friends, how large do you suppose this light was? Ten feet by seven, and eight feet nine inches from the floor, side light a window twelve lights ten by twelve glass. In those days three hundred dollars a year was an enormous rent, for a gallery and garret were the usual places in which they were located. Now our leading artists often pay as many thousands, and have lights large enough to have several cameras separated by curtains or movable partitions, all working at once, with an operator at each camera.

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* *St. Louis Practical Photographer.*

We were called into consultation by an artist who was fitting up a new suit of rooms. The size of light was the question which we were asked to assist in solving. The ceiling was twelve feet high. Now, said he, I have my own idea, I want to hear yours. We proposed to cut an opening fifteen feet square in the roof, which was a flat tin one, then raise a frame for the light. As the sitter must sit on the west with the side light on the left, we proposed to make the light twelve feet square, to raise the south end five feet, the east side perpendicular, the south and west bevelled to meet the frame of the light; the side light we proposed to make twelve feet wide, and bring it down to twenty inches on the floor; the perpendicular wall under the light on the east we proposed should be the ground glass, the rest good glass, but not ground, nor frosted, nor controlled by curtains. The artist was astonished. Why, man, he said, you might as well just sit your patrons out doors. Well, we said, you asked our idea—you have it. Build your light as you please. A year after we called again; he had put in his light the size we suggested, but the walls from the roof to the light were perpendicular, side light three feet from the floor, about one-third less sky visible by the sitter than by our plan. He was very glad to see us, told us he intended to have put in a light seven feet by ten, with side light to match, or seventy feet of sky light and forty-nine of side light. As built, he had one hundred and forty-four feet of sky, and seventy feet of side light. We asked how it worked. Splendid! With his curtains he could modify it any way he pleased, and on rainy or dark days he threw it all open, and worked faster than he used to work in sunshine by his old seven by nine light, and, what was more important, he was making better work. How quick could you take babies formerly? Oh, about five seconds. Well, how is it now? Why, man, it is just fun to take babies now. I catch the rascals in from one to two seconds. Here, again, we say is one of the secrets of rapid work. Light, light, more light! Be sure you have light enough for *any* purpose in *any* sort of weather, then curtain it to suit the particular model you have to photograph.

As to the particular form of light, one of the best we ever saw was set in a flat tin roof, the opening thirteen feet square, the light made in the form of a pyramid with just pitch enough to shed the water, side light; the same width, reached from eighteen inches to the floor, the ceiling being eleven feet high; two sets of curtains, one of fine bleached muslin and one of heavy factory, gave any effect required, while for children with the full speed of the light and a 2-3 quick C. C. H. aperture, the time required was as short as it was possible to give by hand—in fact, as near instantaneous as possible. We have seen a group of fourteen taken on an 8-10 plate in five seconds with a No. 5 extra Voightlander.

If photos. would exercise common sense in respect to their skylights, there would be less trouble about processes. Who would think of running a plough horse against a thoroughbred racer?

No doubt extreme sensitive chemicals will work quicker than ordinary or slow ones, but the light plays a prominent part, if not more so than sensitive chemicals. We hear repeatedly from artists through the country that they find no trouble in making pictures with short exposures with the ordinary chemicals. On enquiry we find that they have large open lights, and are careful manipulators. The Quick and Lightning processes are no doubt a great boon to those with small lights, badly lighted studios in large cities, or those of careless habits that don't keep their regular chemicals in good working order, or utilize the light they have to the best advangage. During the winter months, and on dark days, great advantage can be derived from the many new quick or lightning processes that have been of late introduced into the market. Now, remember, we do not wish to be understood as underrating any improvement or quick formulas of manipulation, but we do wish it understood as asserting that the prime requisite for rapid work is, plenty of light.

PRESS NOTICES AND THE PHOTOGRAPHIC EXHIBITION.

[*From the* Telegraph.]

One of the most attractive and interesting exhibitions yet given by the Photographic Society of Great Britain has been daily bringing numbers of persons—directly and indirectly concerned in the advancement of this modern art of heliography, with its many branches—to the Gallery in Pall Mall East. With an æsthetic conservatism deserving the greatest respect, the council of this institution has heretofore jealously refused to admit hybrid specimens. This reserve was commendable so long as it was practicable; and even now the exclusion of hand-coloured photography, however skilful and artistic, from an array of examples purporting to be strictly the result of light acting upon certain chemicals, is well warranted. It is, however, becoming more and more difficult to distinguish between the photography which is pure and simple and that which admits combinations. On the staircase of this Gallery are hung certain pictures which might very well pass as consummately dexterous copies of original works by the great masters; and on reference to the catalogue these are found to be poikilographic paintings, produced by the Lombardi Art Company. There is no inscrutable secret as to the means adopted in the production of these admirable transcripts, although the process, in certain of its details, is in the exclusive possession of the Company above-named. Moreover, a trained capacity of dealing with pigments, and of managing the niceties of gradation in light and shade, is so imperatively needed to ensure the artistic success of poikilography, that unless ruled and directed by the highest judgment and taste, the whole virtue of the operation would speedily disappear. Under Signor Lombardi's careful control, the finest results are attained; and the inestimable value of the process, as "a worthy means of conveying to those who cannot see the original picture a good idea of their colouring and effect, and thus of spreading a knowledge and appreciation of the higher forms of painting," is verified in so many words by no less an authority than Mr. F. W. Burton, R.H.A., F.S.A., the director of the National Gallery. By way of demonstrating the capability of the poikilograph in its direct application to living portraiture on canvas, a charming picture of Miss Curwen is placed in companionship with fac-simile representations of the art of Rubens, Holbein, Mieris, and Siebold, from their treasured works at Dresden. Conspicuous among the examples of photography proper, on the walls of the present Exhibition, are portraits by Lombardi and Co., either from their Brighton studios, or from their establishment in connection with Messrs. Colnaghi's Art Gallery in Pall Mall. Carbon enlargements and exquisitely finished portraits on "opal" are shown by the firm, chief of whose subjects are Lady Beaumont, Major-General Guise, Colonel Taylor, M.P., King George of Bonny, Signor Zambra, Lord Folkestone, the Rev. J. Cumming Macdona, and Mr. J. Bond, of the British Museum. The Woodbury Company's photographs, printed on their effective tissue, are prominently meritorious objects of the exhibition, their portraits, including one of Mr. Henry Irving, being exceedingly life-like, while their copies of such works of art as Sant's picture of "Adversity" shows how the difficulties of rendering a composition of colours into monochrome can be overcome. A series of views in the Paris Exhibition, and especially in the "Avenue of the Nations," is exhibited by Mr. William England; an extraordinary collection of Russian photographs, from the War Department and Imperial State Paper Manufactory of St. Petersburg, is lent by Mr. L. Warnerke; and the names of Vernon Heath, Marion and Co., Lock and Whitfield, Chaffin and Sons, R. Slingsby, Boucher, Payne Jennings, and Ezra Greaves are well accredited by corresponding works in the Exhibition.

The Photographic News.

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SENSITIVE EMULSIONS FOR NEGATIVES.

The earliest record of an attempt to produce negatives without a silver bath is contained in the fourth volume of the Photographic News, September 1860, in which a letter by H. Bellini appears, claiming the discovery of an emulsion of iodide, bromide, and lactate of silver, not in collodion, but in a varnish consisting of shellac and sandarac dissolved in ether and alcohol. This was alleged to be sufficiently sensitive to give an image in the camera with one or two seconds' exposure. If iodide of iron were also added, this emulsion was said also to be self-developing, and left the camera with a visible image. We were invited by Mr. Bellini to witness the operation; and we are bound to add that it was not a success. An irregular film yielded an imperfect image of a very unsatisfactory kind. "The chemicals were out of order," we were informed, but that "when all was working well, we should be invited again." We fear that emulsion was not a success in Mr. Bellini's hands. Some months later, the records appeared of M. Gaudin's experiments in a similar direction, with emulsions which he styled "photogenes." His experiments were very interesting; and, unlike that first mentioned, were conducted in a scientific manner, but not, we fear, practically successful. An Indian officer, resident at Forest Hill, Captain Dixon, made the next essay in this direction, and showed us some negatives produced without the aid of a silver bath; but how, he declined to state. Remembering Mr. Bellini's experiment, we added nitrate of silver to an ordinary bromo-iodized collodion, and succeeded in producing a negative. As the exposure was somewhat longer, and the result somewhat worse than the bath process yielded, we did not pursue the experiments. Captain Dixon patented his method, which was similar, and nothing more was heard of it. Various other similar experiments were made; but nothing practically successful until Messrs. Sayce and Bolton published their method in the latter part of eighteen-sixty-four. Since then bromide of silver emulsions have steadily progressed, and promise eventually to supersede the use of the silver bath altogether.

Until very recently the sole record of the many and varied trials and changes whereby the process has merged from an experimental stage to a thoroughly practical and successful state has been preserved in the journals. Hundreds of articles have been written, and the fullest information on the process exists. It has even passed into a commercial phase of existence, the production of emulsion plates having become a thriving industry, before a single manual of the process had come into existence. At length Captain Abney, himself a successful worker in this direction, has fortunately filled the void. We say fortunately, because the scattered form in which the information existed rendered reference troublesome, and the work of the emulsion student is rendered more difficult and less efficient; and because, as the production of such a manual sooner or later was inevitable, it is matter for congratulation, amongst photographers, that it should have been undertaken by one whose practical experience and scientific culture rendered him pre-eminently fitted for the work.

Captain Abney, in the manual before us,[*] gives an exceedingly complete epitome of all the practical operations in preparing emulsions and using them, and deals lucidly with the chemical considerations involved in success and failure. That the work is, in some respects, a compilation is admitted with the completest frankness. In his Preface he says: "It has been the endeavour of the author to collect in the form of a 'handy-book' those photographic emulsion processes which have been received with most favour by experienced workers, and with which he is practically acquainted himself; and at the same time to give theoretical explanations of some of the phenomena which are met with in these particular processes. To avoid misconception, the author wishes it to be understood that much of the original substance of the work, except where special references are given, has already appeared in the columns of the Photographic News, or in papers read before the Photographic Society of Great Britain." A good compilation cannot be produced without such practical knowledge of a subject as shall direct judicious selection; but Captain Abney's book is more than a good compilation merely. It is a simple, clear, and intelligent treatise of the process as practised by the author, and is a compilation only so far as it gives the methods of other successful workers to give completeness to the book.

Captain Abney devotes considerable attention to the proper quality of the collodion to be used for emulsions—or rather, we may say, to the quality of the pyroxyline to be employed; but he rightly cautions the beginner against manufacturing pyroxyline, if he can purchase a good sample from a respectable dealer, the operation of making pyroxyline being rightly characterized as the most unpleasant and risky of all operations connected with photography. Unfortunately, it is one which the experimentalist can scarcely always avoid. For some reason, which we will not attempt to conjecture, the manufacture and sale of pyroxyline has never definitely entered into the commerce of this country. Every article used in photography may with certainty and ease be bought of excellent and definite quality except pyroxyline; and in our experience, the purchase of that is always an uncertain operation. Neither do we know of any certain mode of treatment whereby, as Captain Abney intimates, ordinary pyroxyline may be rendered of any quality which may be desired. The only after-treatment we have ever found of avail consists in boiling in distilled water, a process which purifies the soluble cotton, rendering a horny sample somewhat more soluble, and giving a more adherent and powdery film. As Hardwich's formula for the manufacture of pyroxyline is given, we may add a caution derived from our own experience with it. In our practice, we found it to contain too large a proportion of water, and our experiments with it issued in something like fifty per cent. of failures, the cotton dissolving almost entirely in the acids. We may add a formula which we have found to give an excellent sample of soluble cotton for emulsion work, the collodion holding the particles of silver salt well in suspension, and giving a homogeneous film, adhering well to the glass. The formula we subjoin has the advantage that the acids are readily obtainable in commerce of the strength we mention, and are consequently cheap. Six measured parts of sulphuric acid 1·840 (ordinary commercial oil of vitriol will serve), and four measured parts of nitric acid 1·360. This is the strength of acid commonly sold as a pure nitric acid. In three measured ounces of the mixed acids, one drachm of cotton wool should be immersed at a temperature of 150° Fah., using a water bath to maintain that temperature for ten minutes, when the cotton should be removed and washed at once in a large quantity of water. India-rubber gauntlets should always be used when making pyroxyline.

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[*] "Emulsion Processes in Photography," by Captain W. de W. Abney, R.E., F.R.S. (London: Piper & Carter.)

We need scarcely add that Captain Abney enters fully into a consideration and details of the various proposed organic additions to emulsions, and of the addition of uranium and other salts, and fully discusses the various preservatives and "organifiers," as some of the additions have been inelegantly styled. The gelatine emulsion processes are also fully stated, as worked by Mr. Kennett, and different gentlemen who have described successful modifications, amongst whom we mention the names of Mr. Wratten and Mr. C. Bennett.

We may be making a bold and sweeping statement when we remark that within a very few years every photographer, professional or amateur, who wishes to stand abreast with his fellows, must become a master of emulsion processes, which are probably destined eventually to sweep away entirely the use of the nitrate bath, and with it all the heart-aches it continually causes, and the manual before us will prove one of the most efficient guides the photographer can consult in pursuing the new road upon which he must inevitably travel

Critical Notices.

SCIENTIFIC MEMOIRS: Being Experimental Contributions to a Knowledge of a Radiant Energy. By John William Draper, M.D., LL.D. (London: Sampson Low, Marston, Searle, and Rivington.)

The volume before us is one of the most interesting, to all interested in photography as a science, which has been published for many years. The researches of the learned author in the varied phenomena of light extend over upwards of forty years, dating from a period a few years earlier than the recognized period of the discovery of photography. In the early days of photography a galaxy of the most distinguished philosophers of the day were fascinated with the field for investigation and discovery which it opened out to them, and they devoted themselves to aiding in establishing the new art. Treasures of time, thought, learning, and experiment were lavished on it by the most capable chemists and physicists of the period. Sir John Herschel, Sir David Brewster, Sir Charles Wheatstone, Dr. Diamond, Sir Charles Eastlake, Sir William Newton, and a host of other distinguished men in this country; the *elite* of scientific circles in France; Morse and Dr. Draper in America, were amongst the leading spirits devoted to photographic research. Probably the only survivor of these who has prosecuted his researches with unabated ardour is Dr. Draper. And it is interesting, in reading these scientific memoirs, to note how much of what has been regarded as subsequent discovery had been anticipated in Dr. Draper's experiments and conclusions.

It is somewhat curious that Dr. Draper's name has not been associated commonly with the origin of photography, as we find definite records of his labours from the earliest period. It is true that much of his research lay in what practical photographers would be disposed to regard as the outlying regions of their art. As, for instance, referring to a subject which has of late years claimed attention from some able photographers, the study of the Diffraction Spectrum, he says:—"Several years before the commencement of the discovery of photography by Daguerre and Talbot (1839), I had made use of the process for the purpose of ascertaining whether the so-called chemical rays exhibited interference, and in 1837 published the results in the Journal of the Franklin Institute, Philadelphia (July, 1837, p. 45). In this, as will be seen by consulting that publication, I was successful." But it was not only in this essentially scientific aspect that Dr. Draper was interested in photography: he was, as the evidence tolerably conclusively shows, the first who produced a portrait from life by photography. This fact was noted in the *Philosophical Magazine* of March, 1840. This would be about six months after Daguerre's first announcement of his discovery. In France, the home of the discoverer, portraiture by means of the Daguerreotype had scarcely been contemplated. As soon as Dr. Draper heard the details of the process he made the attempt in portraiture. His first impression was that it would be necessary to whiten the face of the sitter, but he found this to be unnecessary. His first attempt was with a double convex lens of four inches aperture and fourteen inches focus, and he succeeded in obtaining miniatures in the open air with an exposure of from twenty to ninety seconds. But later he says:—"On a bright day, and with a sensitive plate, portraits can be obtained in the course of five or seven minutes in diffused daylight. The advantages, however, which might be supposed to accrue from the features being more composed, and of a more natural aspect, are more than counterbalanced by the difficulty of retaining them so long in one constant mode of expression." From this we glean that in the longer sitting no attempt was made to retain precisely the same expression all the time, and that the portrait would be a generalizing of several expressions. Blue glass, sulphate of copper, &c., were used as screens through which to filter the direct sunlight by which the sitter was illuminated. The angle of the light, the colour and quality of the background, are all duly discussed. Suitably harmonizing dresses were recommended, and where this was neglected, the author remarks:—"We have to make use of temporary expedients. A person dressed in a black coat and open waistcoat of the same colour must put on a temporary front of a drab or flesh colour, or, by the time that his face and the dark shadows of woollen clothing are evolved, his shirt will be blue, or even black, with a white halo around it." Reflectors, or reflecting mirrors, were used at the outset in the studio. The concave mirror patented by Mr. Woolcot, an American photographer, is praised as superior to the lens, because it gives the image unreversed. A somewhat amusing and interesting description is given of the camera portraits obtained in these early days. "Miniatures," he says, "produced in the manner here laid down, are in most cases striking likenesses, though not in all. They give, of course, all the individual peculiarities—a mole, a freckle, a wart. Owing to the circumstance that yellow and yellowish browns are long before they impress the substance of the Daguerreotype, persons whose faces are freckled give rise to the most ludicrous results, a white portrait mottled with just as many black dots as the sitter had yellow ones. The eye appears beautifully; the iris with sharpness, and the white dot of light upon it with so much strength and so much of reality and life, as to surprise those who have never before seen it. Many are persuaded that the pencil of the painter has been secretly employed to give this finishing touch." This paper, it should be borne in mind, is dated September 1840. We have improved matters since that time! The pencil of the artist *is* employed, but not secretly, not only to give finishing touches, but to get rid of these wicked indications of freckles!

In dealing with this one interesting practical chapter—and there are many more similar—we have left ourselves no space to speak of the more essentially scientific aspects of the subject, with which the author deals amply and lucidly. We shall, however, recur to the volume again shortly. In the meantime, we commend these essays to our readers as full of interest to the ordinary photographic reader, and as invaluble in their suggestiveness to all experimentalists, and all engaged in photographic investigation in almost any direction.

THE MANUAL OF PHOTOGRAPHIC COLOURING,

forming a Handy-Book on the Art of Painting on the Photographic Image. By Joseph Wake. (London: H. Greenwood.)

A useful and practical book of instructions in colouring photographs. Natural aptitude is one of the most important qualifications for a skilful colourist; but the highest natural aptitude will require some direction and instruction, either personal or written. The instructions before us appear to be those of a practical man. The practice of colouring on photographs is much less commonly practised than it used to be a few years ago, as plain photography has greatly improved in character, and rendered common-place colouring or "tinting" much less desirable. But in some classes of work—such as enlargements, for example—colouring is often desirable. For this class of work we should especially recommend attention to the chapter on solid painting in oil upon carbon enlargements. The plan of tinting in oil, using glazes chiefly, is to be deprecated. The "medium" almost invariably turns leathery and yellow, giving a faded and impoverished aspect to the picture; whilst, if solidly painted with skill, the portrait may possess all the value of an oil painting, plus the faithfulness of the photograph.

There is one point to which we may call the author's attention. It is wise and convenient to be as distinctive in title as possible. In the second title of the manual before us it is called a "Handy-Book" of the Art of Painting, &c. Doubtless the term is accurate enough, but it happens that a series of works connected with photography in course of issue by Messrs. Piper and Carter, under the general title of Photographic Handy-Books," had absorbed the term months previous, and a second use of the same title causes some risk of confusion which is just worth avoiding.

THE SURGEON: or the DOCTOR AT HOME.

By the late Alfred Smee, F.R.S. (The Accidental Insurance Company.)

This is a valuable little compendium of handy remedies for common forms of accident and illness, to be used where a doctor is not at hand. It is the work of the late Alfred Smee, Surgeon to the Bank of England. The *brochure* is issued by the Accidental Insurance Company, and may be purchased for sixpence.

LANTERN READINGS.

(London: Frederic York).

Mr. York has issued a further series of Readings, to accompany and explain the various series of photographic lantern slides he has issued. Those before us alone constitute a singularly complete system of instruction and amusement, fitted for almost every class of audience. Especially interesting are some which deal with the subjects of the day. We have, for instance, the Paris Exhibition illustrated and described most admirably, and a Day's Wanderings in Paris as a fitting pendant. The story of Cleopatra's Needle is told, and with it the History of Egypt, as told by its monuments which the slides show. Very instructive and very interesting descriptive readings are provided to accompany the display of historical series. A Day's Holiday at Windsor recalls the romantic history of the stately royal castle and its surroundings. China and the Chinese, and a Day in London, are not less instructive. We have a vast amount of scientific instruction very entertainingly conveyed in Readings on Magnetism and Electricity, and on the Physiology of the Human Body. The "Romance of History," a pleasant mingling of fact and fiction, furnishes a capital reading. To meet the taste of young folks at festive times, we have "Comical Talk" for comical slides, and the story of Whittington and his Cat, and also that of Aladdin. These are not all; but we have enumerated sufficient to satisfy all interested in lantern entertainments as to the importance of securing a complete set of readings and slides, such as Mr. York can supply them.

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THE NIEPCE MEMORIAL.

Our contemporary, the *Bulletin de la Societe Francaise de Photographie*, contains in its October number an appeal in aid of the memorial to be erected to Niepce. As the movement is to be an international one, and the appeal is addressed to photographers of all nations, we publish a translation of it for the benefit of our English speaking readers:—

The inhabitants of the town of Chalons-sur-Saone have taken the initiative in raising a subscription for the erection of a statue of their illustrious fellow-citizen, Joseph Nicephore Niepce. This is not merely the result of patriotic sentiment; it is a work of justice with which all who are interested in the wonderful art of producing pictures by means of light ought to associate themselves with all their might. For a long time photography was confounded with that particular application of it which bears the name of Daguerreotype, but it should not be forgotten that without Nicephore Niepce we should probably never have known this marvellous process.

It was in 1816 that Niepce commenced his attempts to take light-pictures by means of the camera; he was the first to succeed in obtaining a picture by this means, and in 1824 he produced metallic plates engraved by the action of the sun. It is true that these results were not to be compared with the delicate, accurate, and beautiful reproductions that we see in the exhibitions of the present day, but the process of obtaining them was discovered. The imperfections were due rather to those of the apparatus and instrument employed, than to the process itself, for that remains the same, without essential alteration, to the present day. Natural philosophers of the first rank, like Wedgwood, Davy, and Charles, had previously to Niepce endeavoured to produce sun-drawings, but without success; their attempts resulted in nothing but outlines of shadow, and the light which had produced this image caused it also rapidly to disappear, for it was not fixed. Niepce, instead of these shadow outlines, produced real pictures taken in the camera, and he knew how to fix them. More than that, he educed the image from the film in which it had been formed, thus revealing to us to a certain extent the principle of the latent image. The method suggested by this humble citizen, whom the town of Chalon-sur-Saone is anxious to have the honour of rescuing from oblivion, is still at the present day that which is adopted in all photographic processes.

In all new and successful photographic methods we see the same three principles governing and determining the operations. 1st. The formation of a sensitive film; 2nd. The development of the latent image; 3rd. The fixing of this image. When the illustrious predecessors of Niepce failed where he succeeded, it was because they did not exactly understand the road that they had to follow. These principles established by Niepce were so fertile in result, that after his death Daguerre remained true to them, at the same time improving the manipulations and the details of the operation so as to render them easier in practise.

Any one who has visited the International Exhibition has seen not only the special displays of each country, but also the numberless applications of photography in almost every section. Seeing this great advance, which is due to the discovery of Niepce, leads us to entertain the confident hope that the subscription opened by the town of Chalons will soon be raised, and that at length justice will be done, and proper honour rendered to one who, almost without resources, passed a large part of his life in endowing the world with his wonderful invention. The appeal that we now make is addressed not only to those who have found wealth where the poor inventor found nothing but the pleasures and pains of research into the unknown, but also to those who have obtained from this charming art pleasure without fatigue, and the means of preserving graceful and precious recollections. How great must be the number of such persons!

Thanks to Niepce, the cottage possesses its family portraits and its gallery of pictures; instruction has been rendered more easy and attractive; and the traveller, whilst preserving for himself a permanent record of the impressions gained on his distant expeditions, is able to make fellow-travellers of a numerous audience, and to put before their eyes the dwellings, the monuments, the types of the unknown peoples he has visited. The philosopher can record his researches in a manner which defies the most skilful and practised hand; more than that, he is able to discover the phenomena that would escape the most attentive observation, and be unnoticed with the most perfect instruments.

It is therefore our earnest hope and expectation that all will contribute their mite to the work of reparation undertaken by the municipality of Chalons.

PHOTOGRAPHY IN THE SERVICE OF THE FRENCH POLICE.

From time to time in our French Correspondence, and in extracts from foreign journals, we have brought to the notice or our readers the organization of the photographic department attached to the Prefecture of Police in Paris, under the able management of M. Lombard. Visitors to the International Exhibition will remember the remarkable display in the *Pavillon de la Ville de Paris*, illustrating the administration of that department, and the part which photography plays in judicial inquiries in the French metropolis. As a matter of course, the success that attended the labours of this important branch of the police service has led to its extension, and to the formation of branch establishments in the larger towns of France; that at Marseilles is already in full operation. We extract from the journal *La Jeune Republique* an account of a visit to the studio of the photographic department of the police in Marseilles, established under the direction of M. Dietze at No. 6 *Rue des Olives*.

Marseilles is the first city in France to follow the example of Paris in organizing a photographic staff and workshops especially for the service of the police; following in this the advice of M. Leon Renault, to whom is due the credit of the introduction of this great improvement. The example of Marseilles will soon be followed by the other principal cities of France, and already we learn that the Minister of the Interior is making arrangements for establishing similar offices in Lyons, Rouen, Lille, Nantes, and Bordeaux.

The atelier in the Rue des Olives occupies part of the fifth floor of an old and dilapidated dwelling-house, and consists of two attics that have been thrown into one by pulling down the party wall. By this means a space seven metres long by two and a-half wide has been obtained, with a dark-room of very small dimensions for preparing the negatives, which has been partitioned off. Printing is carried on in the windows of an adjoining apartment. On the first day of the workshop being opened, fourteen prisoners had their portraits taken, both in front and in profile; it is added that they submitted to the operation with a tolerably good grace. Their photographs were ticketed, dated, and numbered, and put away for reference among the records of the office. Photographs will also be taken and kept of forged documents, of the scenes of remarkable crimes, of dead bodies, and of other objects of interest in police enquiries.

The department at Marseilles is under the direction of M. Alfred Mercier, who has been for a considerable time attached as photographer to the service of the police in Paris. He was appointed to his present post on the strong recommendation of the authorities at the central office.

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.[*]

The author here introduces a chapter on the action of acid chromate baths on gelatine, meaning by this expression, as he premises, those solutions of the chromates which contain chromic acid in a free state, and also those containing in addition the bichromates; in the latter category are included nearly all the baths in which the potassium bichromate is acidulated with sulphuric or hydrochloric acid. Under the term acid chromate baths must not be understood a mere solution of the bichromates, for according to the views of modern chemists, salts like the bichromates of potassium and ammonium are not considered to be real acid salts, but rather the neutral salts of dichromic acid.

Carbon prints can be obtained with a solution of pure chromic acid alum: they are vigorous, but without half-tones, and the film becomes insoluble with a slight increase of temperature, and in a very short time. Acidulating a solution of potassium bichromate by means of the mineral acids sets free more or less chromic acid, and a very slight addition of acid is sufficient not only to render the carbon prints hard and wrinkled, but also to cause the chromated gelatine to become spontaneously and quickly insoluble. If acetic acid be used instead of the mineral acids it will not have this effect, because acetic acid has not the power to set free chromic acid from potassium bichromate, though it is able to convert the mono-chromate into bichromate. The addition of acetic acid to the chromated gelatine enables the whole of the chromic acid in the potassium bichromate to be used up; otherwise the action of light would cease at the point of conversion of the bichromate into mono-chromate, but the acetic acid reconverts the latter into bichromate. In the photo-electrotyping process, acetic acid can be used with effect. In the first place, it produces a peculiar and often desirable degree of consistency in the gelatine, as well as a characteristic structure in the film equivalent to a fine graining; and in the second place, the solution of the unaltered gelatine in hot water is more readily effected. On the other hand, the durability of the film is by no means so great as in one treated with the double chromate of potassium and ammonium; also the sensitized plates become much easier soluble by keeping than those prepared in an ammoniacal solution of chromate, on which account the author prefers the latter method.

In the next chapter the author treats of impure and commercial samples of the chromates, and of the extent to which they can be employed in photography. He finds, he says, a prevailing opinion that impure bichromate of potassium—that is, such as is contaminated with the sulphate of the same metal—cannot be used in the gelatino-chromate processes. Generally, a quite pure salt, and one that has been several times re-crystallised, is recommended. For this reason the author paid special attention to this point. He examined six commercial samples of potassium bichromate, obtained from different sources, choosing always the cheapest kinds. Four of these, treated with hydrochloric acid and barium chloride, gave either no cloudiness, or only a very slight one; two specimens alone gave a decided cloudiness. These two, on being submitted to a quantitative analysis, gave the following results:—The first contained 0·35 per cent., the second 0·51 per cent. of potassium sulphate, neither representing an impurity of any great importance. It may therefore be assumed that ordinary commercial potassium bichromate is sufficiently pure for photographic purposes; but where it is found to be adulterated with the sulphate to any appreciable extent, the author recommends the following method for purifying it. He digests the solution of potassium bichromate for some time with barium chromate, shaking the mixture frequently; by this means the barium chromate is converted into sulphate, and precipitated; if the solution be now filtered, the filtrate will be quite free from sulphate. But, perhaps, the best and most convenient method of getting rid of all impurity is to re-crystallize the salt.

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[*] Continued from page 556.

In order to determine how the potassium sulphate really acts, the author mixed 0·5 per cent. of this salt with a three per cent. solution of chromate, and sensitized some carbon paper in the mixture. At the same time he dipped another piece of the paper in a pure chromate solution. Each of these pieces was divided into three parts, and, after drying them in the air, the parts were placed respectively in a drying box over calcium chloride, in a space saturated with moisture, and in the open air—of course, all in the dark. Every day specimens were simultaneously exposed under the photometer. The papers sensitized in the two chromate baths behaved in every respect alike; they were equally sensitive, equally soluble, and gave equally brilliant pictures. Now the quantity of potassium sulphate which the author has mixed with the chromate solution is proportionately much larger than that which could possibly be found in the solid salt of commerce; he deduces, therefore, that the ordinary commercial potassium bichromate is perfectly efficacious in photography, and that even when the sulphate is present, it will produce no injurious effect on the process.

It has also been alleged that the salt as commonly sold contains traces of chromic acid and chrome-alum. The author has not been able to detect the presence of those impurities, and he moreover asserts that, if they existed, they would not be detrimental. Besides, any trace of acid which may manifest itself can be neutralised by the addition of a few drops of ammonia, as is now generally practised.

In addition to the bichromates of ammonia and potassium, another chromic salt is now advertised, at rather a high price, for employment in the carbon process, to which purpose it seems to be well adapted. This is the salt sent out by the Autotype Company as a chrome compound for sensitizing carbon tissue. It is in the form of small orange-yellow crystals, which are stable when exposed to the air, and dissolve easily in water. As its composition was not known, the author analysed the salt, and found it to be free from ammonia and sulphuric acid, and to contain chromic acid and potassa in the following proportions:

	Estimated	Determined
Chromic acid	68·78	67·83
Potassa	31·22	31·60
	100·00	99·43

This composition agrees exactly with that of potassium bichromate. The chrome-compound of the Autotype Company is nothing else than pure potassium bichromate, obtained by rapid crystallisation in the form above described. Of course, potassium bichromate obtained from any other source, provided it be pure, would answer equally well.

The author proceeds to speak of the influence on chromated gelatine of ozone and thunder-weather. With regard to the former, he concludes that a gelatine solution absorbs ozone, and is acted on by it, but so slowly that no chemical change can be detected. On the other hand, a gelatine placed to dry during thundery weather very soon decomposes.

Some photographers assert that ozone and thunderstorms have an injurious action on chromated gelatine, rendering carbon paper insoluble, and giving a reticulated appearance to the prints. In making such an assertion they seem to labour under the delusion that the formation of ozone and the development of an electrified condition of the atmosphere are co-ordinate and correlative. It is quite true that lightning causes ozone, and equally so that the passage of storm clouds produces a change in the electric state of the air; but it is incorrect to assert that the maximum development of ozone always accompanies a thunderstorm. The action of ozone and of thunder-weather on chromated gelatine should be regarded as quite distinct and independent. According to the author, the influence of thunder is to be ascribed rather to the warm weather that generally precedes it, and to the comparatively large amount of moisture contained in the atmosphere, not to mention that Vogel denies that thunder-weather possesses any injurious effects whatever on the carbon process. (*To be continued.*)

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THE PEARSALL VIGNETTING ATTACHMENT.

BY G. F. E. PEARSALL.

The object of this invention is to secure a permanent contrivance attachable to the ordinary photographic printing-frame, that will readily accommodate the varying sizes and shapes of the different images on negatives.

It is unnecessary to describe the many arrangements hitherto provided for vignetting photographs, of which some are too complicated and expensive, while others have claims to simplicity only, failing to do the work satisfactorily; others, again, accomplish many things to be desired, but require a long time to adjust, being cumbersome and easily disarranged, thus materially interfering with the removing of prints and supplying fresh paper, and causing a loss of time and patience. The great desideratum is to secure simplicity and effectiveness, to have an attachment to the printing-frame that may be easily and quickly adjusted, remaining positively secure during the operation of printing and changing the paper, and that can be quickly readjusted, or, when a different negative is placed in the printing-frame, can be adapted to it without loss of time. These requirements are all effectually presented in this contrivance. By it one man working ten frames can vignette from thirty negatives in less time than two men could formerly do the work with thirty frames. A cardboard with a hole and tissue paper on the outside has been used for many years, and the claim for something new and useful is in the improved manner in which these are applied and used. The practicability of this attachment is proven by its simplicity, as any one can operate it at sight. Two thin frames are hinged together, so as to allow the movement of a cardboard in any direction between them; tissue paper is pasted on one frame; two small hooks fasten the lower, and one hook the upper frame, binding all firmly in place.

Mode of Use.—Hook the attachment to the printing-frame; lay the frame on a table with the back up, and then remove the back; place the negative in, also the sensitive paper; replace and fasten the back, turn the frame over, loosen one of the brass hooks, open the binding-frame, lift the card, and place cotton on the lower part if required; then readjust the aperture card, fasten the binding-frame, and all is ready to place in the sun.

Practical Advantages.—First the adjustment is so quickly done that hardly any time is lost in regulating it. The apparatus can be handled just as readily as the ordinary frame for printing plain prints, a number can be carried at one time to and from the light, and a thousand prints can be made without fear of the adjustment being disarranged; but, if required, it can be readjusted for another negative in less time than it takes to write these words; or, it can be removed, and the frame used for plain or medallion prints at pleasure, by simply unhooking. The diffusing screen, tissue paper, or other materials being glued to and moving with the binding-frame, and so protected by it, will with ordinary use last a long time; but if torn by accident, another piece can be attached in a moment. Several extra cards with two different shaped and sized openings in each will be found convenient, and as there is no pasting of the tissue paper on them, they will remain good for years.—*Anthony's Photographic Bulletin.*

Correspondence.

MEDALS AT THE PHOTOGRAPHIC EXHIBITION.

Sir,—I can only go by the President's statement. You use the strong word "deceive." I only said the assurance was incorrect. I find it necessary, in consequence of your append, to state as follows:—

1st. In more than one of the pictures exhibited by Mr. Jennings, in frame No. 199, the skies are printed in an impossible relation to the horizon of the foreground—revealing at once, to competent observers, that two negatives have been used. 2. A gentleman in the country wrote to me to obtain him copies of the said prize pictures. They were so obtained, and sent; but some short time after were returned to me with the following letter:—

"I have compared the prints sent with those inthe Exhibition, and find, to my surprise, that in four out of the eight different skies are printed into the foregrounds; in three cases from other sky negatives altogether; and in the fourth the same sky negative was used, but in a different position. I think the Council ought to consider if it is to the credit of the Society that such a thing should be possible, and whether, if it is deemed right to give medals to pictures printed from different negatives, some security should not be obtained from exhibitors *that pictures ordered and bought as copies of the prize medal pictures* should scrupulously and honorably fulfil that condition."

For myself, as this is a new question, and I do not imagine such a thing ever occurred before, I will not at present add any opinion of my own to my correspondent's, but I trust photographers may have something to say on the subject.—Yours, H. Stuart Wortley.

[If an assurance were given that prints were produced from one negative, which were in truth printed from two or more negatives, such assurance could have but one aim and one end; namely, to deceive. As we had been frankly informed by Mr. Jennings that two of those exhibited were printed from more than one negative, it was our clear duty to acquit him publicly of any intention to deceive. Of course, Col. Wortley will see that we cannot say anything of the other prints to which he refers, neither can they in any sense affect the question of the medals. We can scarcely conceive that Col. Wortley seriously endorses the proposition of his correspondent, to the effect that the Council should in any way interfere in the commercial operations of exhibitors. Good faith in trading is amenable to a higher tribunal than even the Council of a Photographic Society. An inexorable and all-prevalent laws brings, as a rule, failure to dishonesty, and success only to fair dealing.—Ed.]

Sir,—Replying to Colonel Wortley's letter concerning my photographs of yachts, &c., in rapid motion, I must first state that I always wished it to be clearly understood that, in some cases, clouds from separate negatives were introduced. Secondly, I am unaware of any rule of the Society's forbidding this method of procedure, always considering that it was for the jury to judge whether or not the effect was in harmony. If the introduction of clouds from separate negatives had been forbidden, nearly all of the best landscapes in the late Exhibition would have been disqualified. If, however, I am to understand from Col. Wortley's letter that he wishes to impute an attempt at deception on my part, I must accuse him of a want of gentlemanly feeling in the matter, as he should have first made himself clear as to the position I held with regard to the photographs in question.—Yours truly,

Payne Jennings.

A CORRECTION.

Dear Mr. Editor,—In the notices in the last Photographic News, referring to the late Technical Exhibition, an error occurred. A new chromotype and combination printing fram invented and exhibited by myself, is credited to a Mr. Lang. If you would not mind correcting this in your next, I should be much obliged.

I hope to have the pleasure of waiting on you with one of the frames, when I think you will see that it possesses such decided advantages as will render it more serviceable for chromotype and double printing operations; and, withal, cheaper than any other photographic printing-frame brought before the photographic world.—I am, dear sir, yours truly, John Talbot Lane.

Proceedings of Societies.

Manchester Photographic Society.

The usual monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 14th inst.

The Council had previously met at six o'clock, when Mr. **Alfred Brothers**, F.R.A.S., Vice-president, occupied the chair. In consequence of Mr. Thos. Heywood, who had been elected President at the previous meeting, refusing to accept that office, on account of ill health and inability to attend the meetings, it was proposed and seconded that Mr. Charles Adin, the late Secretary, be elected President, which proposal met with unanimous support.

At the subsequent general meeting of the members Mr. Brothers again took the chair, and the minutes of last meeting were read and passed.

The **Chairman** then communicated to the members the refusal of Mr. Heywood to accept office, and also the appointment of Mr. Adin as President.

The latter announcement was received with great satisfaction by the whole of the members; whereupon Mr. Brothers retired in favour of the new President, who took the chair amidst cheers.

Mr. **G. T. Lund**, Vice-President, in a short and graceful speech, then introduced a "*secretaire*," consisting not only of a most convenient writing desk, but also forming a handsome piece of furniturer, the result of a subscription made by Mr. Adin's warmest friends, and which was then presented to that gentleman in the name of the Society, as an acknowledgment of eleven years' diligent services as Secretary.

The **Chairman** said that, though somewhat unprepared for the honour they had conferred by electing him President, he must tender his most sincere thanks for the very kind manner in which his friends came forward with their testimony of esteem, and. in a very amusing manner, he (the Chairman) recounted some pleasant reminiscences connected with his former office, but reserved for the next meeting his remarks in reference to his election as President.

The following gentlemen were duly elected members:—The Rev. F. E. Waldie. Mr. James Shepherd, C.E., Mr. W. B. Wood, and Mr. J. W. Wade.

Mr. **Oakes** read a second communication on "Combination Printing for the Stereoscope," which will appear in our next number, and illustrated the same by a large collection of stereoscopic transparencies (the production of the late Mr. Breese), some apparatus, and several drawings and diagrams, and concluded by promising upon the next occasion, which would conclude his communications on the subject of stereoscopic transparencies, to print one or two before the members.

The **Secretary** then read a letter received from the Liverpool Amateur Photographic Association, to the effect that a negative of a group, taken on the occasion of the joint excursion of the two societies to Hawarden by Mr. W. E. Potter, had been sent down with permission for any of the members who wished to possess a print. Mr. Gregory then very generously proposed to supply prints gratis to all the members who desired to possess one.

A lantern slide was next shown by aid of the Sciopticon. This was also a group taken at Hawarden, on a Kennett plate, by Mr. L. W. Weber, of Liverpool, and was much admired.

Mr. **Brothers** exhibited a very novel clock dial arranged for use in portraiture, constructed for him by Mr. Cussons, of Southport. The points of novelty in the apparatus were that the dial was covered by a black disc through which a small square aperture was cut, and only permitting one figure of the white dial to be seen at a time; and by a rachet wheel and sprint at the back (under the control of the operator) it was so arranged that the disc could revolve, thus exhibiting the figures on the dial in succession. The object of the apparatus was that, while fixing the attention of the sitter, it gave relief to the eye by following the aperture through its circular motion.

Mr. **John Holden** said he thought that the pupil of the eye would be enlarged by following the circular motion of the disc.

Mr. Brothers explained that by reason of its small diameter (about five inches) and the distance of the sitter no enlargement would be perceptible.

Several of the members very much admired the apparatus, and expressed a desire to possess one.

Mr. W. J. Chadwick (the Secretary) exhibited some excellent coloured photographs of the Crystal Palace, by Messrs. Negretti and Zambra—one of the Egyptian Court exciting universal admiration. He also exhibited a quantity of specimens of a new process in photography, invented by Mr. W. B. Woodbury, representing water-marks in ordinary writing paper, and also a lamp which he (Mr. Chadwick) had devised for burning house gas in the sciopticon. The lamp was on the argand burner principle, but instead of giving a circular flame it was arranged to give two flat flames, as in the sciopticon lamp. A square chamber (similar to those in oil lamps) was provided, and he explained its superiority when this chamber was filled with benzine or mineral naphtha, but stated that he had not yet been able to obtain so good a light as with the sciopticon oil lamp, though very much superior to the ordinary argand burner.

Mr. M. Noton thought if small pieces of coke were introduced, so as to absorb the carbonizing agents, the evaporating surface would be much increased, and a better light thereby obtained.

After some discussion between Messrs. Noton, Watts, Oakes, and Chadwick, Mr. Noton offered to try a few experiments with the lamp, and report the results at the next meeting.

Mr. J. Leigh exhibited a washing box for paper prints, which consisted of a square box on the syphon principle, with trellis-work trays, for the purpose of keeping the prints separate when washing. The same gentleman also exhibited a very simple, inexpensive, and effective "back-pressure valve," constructed of glass and india-rubber tube, similar to that in Bunsen's pump.

A carbon photograph was then passed round—the presentation picture of the Edinburgh Photographic Society, which had been kindly sent for the Society's portfolio.

Votes of thanks were passed to **Mr. Oakes**, the President, and various other gentlemen who had contributed to a most interesting evening, and the proceedings terminated.

Talk in the Studio.

South London Photographic Society.—The annual meeting of this Society will be held on Thursday next, December 5th, in the rooms of the Society of Arts, Adelphi, when the election of officers for the ensuing year will take place, and other business transacted, after which some papers will be read, one by Mr. W. T. Wilkinson, Colombo, Ceylon.

Australian International Exhibition, 1879.—The Regulations for British Exhibitors have been approved, and are now obtainable, together with Forms of Application, from Mr. Edmund Johnson, Honorary Secretary of the London Committee, at the offices of the Exhibition, 3, Castle Street, Holborn. The space at the disposal of the Committee being limited, early application is recommended.

The Motion of a Waggon Wheel.—The instantaneous photographs of trotting horses, taken by Muybridge, of San Francisco, furnish the first visible demonstration of the much disputed fact that the top of a waggon wheel when running along the ground moves faster than the bottom. It is obvious that the instantaneous photograph of a wheel, revolving upon its axle in the air, would show all parts of the wheel with equal distinctness. But if the wheel have a progressive motion, and any one portion has a greater motion than its corresponding part, above or below, there must be a liability to blurring in that part of the picture. These pictures are taken with so brief an exposure that the horse, though moving at a 2: 24 gait, is sharply outlined. The wheels of the driver's sulky, however, have a different tale to tell. The lower third of each wheel is sharp and distinct as if absolutely at rest. Not so with the top, that part of the wheel showing a perceptible movement during the two-thousandth part of a second of the exposure of the plate. The upper ends of the spokes are blurred, and the rim likewise, thus giving a physical demonstration of the truth which mathematics establishes.—*Scientific American.*

To Correspondents.

⁂ The Year-Book of Photography for 1879.—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

Safety.—The use of flashed glass or pot metal is very much a matter of taste, the effect of the two is essentially different. The image on the flashed glass is quite on the surface, as on paper; but on the pot metal the image looks sunken, in, and has a much softer effect. The fact of staining, or not staining, would not be affected by the use of one or the other. As a rule, we prefer an opal picture without varnish; but this is a matter for individual taste and judgment. 2. There is no danger in using mixed gases unless the flame comes into contact with them. If you use a safety jet, by which the possibility of the flame being drawn into contact with the gases is destroyed, there is no danger. Do not be tempted to run any risk.

Leo.—The use of the electric light for photographic purposes is not patented, nor can it be patented. Special methods may be patented if they are new. In Vander Weyde's case it is the use of certain kinds of large lenses. You may apply the electric light to portraiture in any way you choose, excepting that patented.

Nitrate.—The statement of the gentleman to whom you refer is not quite accurate, but not so far incorrect as you seem to think. The atomic value of sulphur is 16, and that of silver 108, so you may easily make the calculation.

R. M. D.—The collodion used in the present day for negatives will generally answer for producing collodion positives. At one time the destinction between negative collodion and positive collodion was well marked, but was, to some extent, preserved as a secret amougst makers of collodion. In consisted chiefly in the fact, that negative collodion was simply iodized, whilst positive collodion was bromo-iodized. The addition of a bromide was necessary to the production of good positives. But we believe that all, or the greater majority of, commercial samples of negative collodion in this day contain a bromide in greater or less proportion, and hence may be used for positives. The iron developers used for negatives may also be used for positives. The difference in result is chiefly a matter of manipulation. A developer containing 15 grains of proto-sulphate of iron in an ounce of water, with 15 minims of acetic acid and one mimim of nitric acid, will generally yield a good positive. Ambrotype was an American appellation for collodion positives. Ferrotypes and tintypes are the same thing on an enamelled iron plate. The same operations and formula answer with all. For the iron plate a collodion of more body is desirable, and an image a little more dense than where glass is used, otherwise the image looks dull and heavy.

Negative.—An alkaline developer applied to an ordinary wet plate would produce immediate fog. If the free nitrate of silver were quite removed by washing, an alkaline developer might be used; but it does not suit an iodized plate so well as it does a bromized plate. Many of your suggestions want trying before comment can be offered.

R. F.—A gold frame close up to the picture suits a massive style of photography, in which shadow prevails, but a margin is better for most kinds.

Thos. Lord.—Many thanks.

Frank Settington.—There is not any work devoted to opal and other enlargments; but many articles on the subject have appeared in our columns. The production of enlargements on opal glass is a simple matter. All the instructions which appeared in our pages and in our Year-Books a few years ago for producing photo-crayons are exactely applicable to the production of similar enlargements on opal.

Leo.—Your letter arrived too late for answer last week. In order to secure an answer the same week, questions should reach us on Wednesday morning, or earlier. Collodion turning red on mixing shows that free iodine has been liberated. It often arises from the presence of acetic ether in the sulphuric ether. It is generally injurious.

Hogshead.—We have not facilities for judging much about the photographic market. As a rule, it is customary, we believe, in producing photographs of English or other scenery, to produce a district or series, and arrange with a special publisher, who may have special facilities for distribution. Mr. Frith, of Reigate, could give you information if you have anything to offer him. He publishes views largely.

T. M.—A collodion transfer is practically a collodion transparency, or positive transferred to paper. The transparency for this purpose must be developed with a special view to examination by reflected light rather than by transmitted light. To give it force and depth, it is generally desirable to tone it. This is best done with a neutral solution of chloride of gold, four grains to the ounce of water. They should be done before transfer.

T. C. L. Lempriere, J. C. H.—Thanks. In our next.

The Photographic News, December 6, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO

Clouds and Foregrounds in Pictorial Photography.

The matter of printing in clouds upon landscape pictures, which has lately arisen in these columns, is one so thoroughly recognized, that it is really scarcely worth discussing. Without going into the merits of the question which gave rise to the controversy—it would, perhaps, be difficult to do so, since one can hardly understand what they actually are—it is obvious that the main issue must always be whether the ends justify the means. A photographer produces a picture of the Dargle, in County Wicklow, for instance: if the result is such that, without being hypercritical, most people are pleased with it, the photographer has succeeded in all he desired. Perhaps an astronomer or scientific meteorologist, knowing, first of all, that the clouds had been printed-in, would be able to point out the fallacy of some of the lights, and to prove that the picture was taken at twice (since he is quite sure this has been the case), and so put the photographer to shame. But if the great number of persons look upon the picture with pleasure, and, rather than find fault, admire its composition very much, the producer thereof is quite satisfied. He does not make his pictures for critics, but for people who like them and buy them. If, by employing a cloud negative, he can heighten beauties in a landscape, by toning down the glaring white sky which is not true to nature, then he is quite justified in doing so. But it all depends on the result. If his efforts result in an abortion, which a child recognizes as a bit of clumsy trickery, then nothing can excuse his conduct. He deserves all the sharp criticism he gets. The *Saturday Review*, some time since, in criticising Mr. H. P. Robinson's Pictorial Effect in Photography, was very hard upon the author in respect to this very subject. Instead of printing in clouds as Mr. Robinson suggests, the critic asked, why render such a performance necessary at all?—why not take the clouds always with the landscape at one and the same time? Such a notion has, at any rate, one thing to recommend it: there is a refreshing greenness about the suggestion which all photographers must recognize. To do as the *Saturday Review* recommends, would save time both in operating and printing; while, again, it would preclude the possibility of the photographer being charged with trickery. We wonder the latter was not enjoined to render the grass green, and the tree stems black, the lakes blue, and the corn yellow. He would find all this quite as easy as attempting at times to take clouds in with his picture. That it can be done on occasion is perfectly true, and, when the feat is possible, photographers are as alive to the circumstance as most people; but to attempt to secure in a woodland scene, bright clouds at the same time, for example, as a grotto-like cavity full of ferns and green undergrowth, is a task simply out of the power of the photographer of to-day. To go in and win is excellent advice, and it is a pity, therefore, that it cannot be always acted upon. But photographers do their best, and in general are successful in making a happy combination. "That is a capital picture, but it looks as if a thunderstorm were brewing," is, perhaps, the criticism if dark cloud masses have been printed in too lavishly; and, although this may not have been the actual desire of the photographer, there is in that case no reason why the picture should be tabooed. Weighing a landscape too heavily with cloud is always to be deprecated unless one desires the spectator's eye to be more particularly attracted to the sky; the latter can always be lowered in tone, so as to subdue the cloud formations if they are too vivid, and in this way serve as a foil to the landscape, and heighten its high lights. In cloud and sea pictures, which can very often be secured on a single plate, the idea usually is to secure effective cloud masses, for to these is the eye usually attracted—so much so, indeed, that many of them are simply cloud studies, and nothing else. But, to instance the magnificent heather pictures of Mr. Robinson, the bijou sketches of Gordon, England, and Bedford, as also the rich brown forest scenes of Payne Jennings, is but to show what may be done by making cloud negatives subservient to one's purpose in completing an artistic picture. As we have said, if the effect of printing-in is simply a monstrosity, the photographer must take all the blame he gets; but it is seldom that a master of the art cannot so arrange matters that no double printing is obvious to the major part of spectators, and these are all he cares to please. That combination pictures are not regarded by schools of art in the light of inartistic productions is at once proved by the fact that the Langham Sketching Club, which is made up of artists of high standing, have from time to time had Mr. Robinson's pictures before them, and employed the photographs for purposes of study. They could not do better, for Mr. Robinson is artist enough to seek out the finest cloud formations, and to know what to do with them when he has secured them. But one of the best excuses for employing cloud negatives is the fact to which we have already referred, namely, that the intense white patch that usually represents the sky in a single print is usually as false to nature as any badly-printed clouds can be. Of course, in a pictorial photograph, any more than in a painting, we do not aim at absolute fidelity in reproduction of a scene, but are quite satisfied if the aspect may be true. That is enough. We choose a scene by the river bank, and then look about with an eye to the best foreground. If we are not satisfied, we proceed to help ourselves, and, so long as we do so with skill and a due regard to the subject, none can cavil at our efforts. Nay, it is very probable they are not perceived when we take our picture. A straight bit of wood from a fence or gate occupies, maybe, a prominent place in the foreground. This alone would spoil the picture if left as it is, but some bits of ivy twirled around it at once break the long lines, or perhaps an uprooted bush will have the same effect. The representation of these in the foreground is very striking to the eye in the picture, but because they were not naturally on that spot at Cookham by the Thames, the photograph is not for that reason invalidated. Many photographers go so far as to print in a foreground in the same way as they print in clouds. A tree-trunk, or a cluster of bracken fern, it is perfectly legitimate to introduce in a rustic picture, and only when one can positively assert that such objects are impossible in the place given them, can any exception be made to their presence. If the result does not outrage truth, and heightens the effect of the principal points in the picture, the photographer cannot be wrong in adopting such aid. We get too much in the habit of looking only at the severely truthful aspect of photography. In many branches of the art, absolute truth is obviously of the highest importance; and in scientific, or fac-simile work, touching and modifying is, of course, to be deprecated. But it does not follow that the camera may not be put to other uses, and, guided by skill and artistic ability, be made to produce photographs whose first claim shall be their pictorial value. This must not be lost sight of; and when such men as Rejlander and Hubbard have produced work which critics tell us look like photographs of pictures, the disciple of the camera need not despair of using the pencil of light pretty much as the painter employs his pastels and pigments.

FRENCH CORRESPONDENCE.

Determination of Length of Exposure in Dry Processes—New Work by M. Leon Vidal—Conferences on Reproductions of Works of Art—Developing Bath for Portraits.

Suggestion for Obtaining Precision in fixing the Duration of Exposure in Dry-plate Processes.—M. Dorval, of Paris, a photographer of great experience, who has lately been almost exclusively engaged in preparing dry plates, has sent me some remarks on his researches. These remarks appear to me to be so pertinent and sound, that I have no hesitation in making them known; more especially as they bear on a question the complete solution of which can only be hoped for by the co-operation of all who are interested in the subject. Up to the present, notwithstanding the very extended employment of dry-plate photography, we possess no experimental method of determining with sufficient accuracy the comparative rapidity of the different processes that have been published, or are being studied. In consequence, when a new process is brought out, the most skilful operators are only able to determine relatively the greater or lesser amount of rapidity with which it can be worked, and the different statements on this point must necessarily vary the one from the other. One operator will say that it equals or surpasses in rapidity the wet collodion process; another, on the contrary, that it requires an exposure double or treble the time of the latter. In some cases, experimentalists whose word can be strictly relied on will say that the process requires a duration of exposure five or six times as long as that given by the inventor. Divergence of opinions like this is easy to explain when it is considered that the various wet processes that are taken as terms of comparison differ considerably among themselves as regards rapidity. It must be evident that a dry process will require an equal, or a double, or a triple length of exposure, as it is compared with one or the other of the wet collodion processes. According to M. Dorval, it is not possible to accurately express the rapidity of a dry-plate process by comparing it with that of one depending on wet collodion—at least, unless it is clearly determined at the outset what, under the given conditions, ought to be the rapidity of the wet plate process that is taken as a standard. What would be required would be some simple method whose details would be accessible to all photographers, and of which we could say—with such an amount of light (very precisely determined) it requires so many seconds to produce an exactly equivalent reduction on a certain plate (A), either wet or dry; on the other hand, it requires so many seconds under the same conditions to produce the same extent of reduction on another plate (B). Calling the number of seconds in the first case C, and in the second D, the result of the experiment would be found by the following proportion:—As regards rapidity, the two plates that are compared (or, rather, the two processes that they represent) are to one another as C is to D. By this means—and it is, in fact, what is required—the same experiment could be repeated under identical conditions by any other experimentalist, and for any other process. It will be seen that the solution of the problem depends on the realization of these identical conditions. The question is, Can they be realised? M. Dorval thinks that they can, and we entirely agree with him. We therefore invite all those who are interested in the progress of photography to study this question, convinced as we are that the application of their collective efforts will not have to wait long for a result which will doubtless be in every respect satisfactory.

A New Work on Photography, by M. Leon Vidal.—When making an agreement with the Society Anonyme des Publications Periodiques for working his process of "Photochromie" in the offices of the *Moniteur Universel*, M. Leon Vidal undertook to act as manager during the time necessary to organise the arrangements, and to put the process into good working order. Since that period three years have elapsed, and the process is now so far placed on an established footing that the inventor is able to entrust to another the superintendence of an undertaking which absorbed all his time. He therefore enters again on the path of investigation and research where his previous experience assures him a success from which our art cannot fail to reap an advantage. Scarcely has this indefatigable worker in the field of science resigned his previous post, then he undertakes the publication of a treatise—or, rather, series of distinct treatises—on the various methods of permanent photographic printing. Of these the most important and practical will be the treatises on collotype, photo-engraving, Woodburytype, chromo-photochromy, photo-typography, photo-lithography, photographic enamels, &c. As he is anxious that this work may be as complete as possible, M. Leon Vidal appeals to all photographers (amateur as well as professional) who employ any of these processes to be good enough to supply him with any information as regards their working which they may wish to appear in the various monographs. The treatises will be issued separately as fast as they are finished, and when all are complete they will be published in a collective form, under the title of "Annales de Photographie." The first of them, which is devoted to collotyping, will appear shortly. All letters and papers should be addressed to the author, 58, Rue Jacob, Paris.

Conferences on the Reproduction of Art-Works.—We learn at the same time that at the instigation of the Director of the Ecole Nationale des Arts Decoratifs, which has been recently established, the Directeur-Général des Beaux-Arts has authorized M. Leon Vidal to hold in that institution a series of conferences on the reproduction of works of art. It will, of course, be taken for granted that photography will hold a prominent place as a subject of discussion in these conferences; this is therefore another instance of the official recognition of our art in France, and my readers will no doubt agree with me that it may be made a powerful means of popularising not only art in general, but that of photography in particular.

A New Developing Bath for Portrait Photographs.—An amateur photographer from the provinces, who lately paid me a visit, spoke so loudly in praise of a developing bath for portraits—due, I believe, to M. Flament—that I have no hesitation in reproducing the formula in the Photographic News. Very possibly I have already mentioned it in one of my previous letters, but really sound information is precious enough to bear repeating. M. Flament prepares beforehand, and keeps, a reserve of a saturated solution of the double protosulphale of iron and ammonia, a salt which is soluble in twice its weight of cold water. At the instant of developing he takes twenty cubic centimetres of this solution, and adds to it—

Distilled or rain water	80 c.c.
Acetic acid	10 ,,
Alcohol of 40°...	5 ,,

The bath is then ready for use, but by adding a few drops of a five per cent. solution of sodium acetate it gives greater delicacy, without affecting the rapidity of the development. Made in this way the developing bath may be kept for a long time without undergoing change; otherwise it is apt to turn red in contact with the air soon after it has been prepared, to the loss of its power of reduction. This bath is therefore very useful for amateurs who are unable to work continuously. By means of it they can avoid failure and loss, for a bath prepared beforehand is good for nothing if it suffers the deterioration that I have mentioned.

Ernest Lacan.

REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

The next chapter of his treatise the author devotes to the process of the alteration of the chromated gelatine by light. He commences by pointing out that the action of light on a mixture of gelatine and potassium bichromate depends on the phenomenon of the reduction of the chromic acid, or, in other words, on the oxidation of the organic substance. In all chromato-photographic processes the chromate is observed to turn first brown, and then, under the continued action of light, green; this phenomenon is the distinguishing mark of the success of the process, and it manifests to the eye the formation of chromium chromate, and finally of chromium oxide. The questions then arise:—Is the potassium bichromate in the presence of gelatine undoubtedly reduced to chromium oxide? Does the chromium oxide thus formed in the exposed part of the film really give rise to an insoluble compound with the unaltered gelatine? And does the insoluble image consist of oxidised gelatine, either alone or combined with the chromium oxide that has been formed?

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* Continued from page 574.

To prove that bichromated gelatine, after being acted upon by light, is rendered insoluble by the presence of chromium chromate, the author made and describes the following analysis. He dried and exposed a mixture of potassium bichromate and gelatine, until it turned a deep brown colour, and then boiled it in several waters until the latter became no longer yellow. The brown clots he dried to a constant weight at a temperature of 100° C., and afterwards ignited them; the residue consisted of chromium oxide and the ash from the gelatine. To determine the amount of the chromium oxide, he fused the residue with soda and potassium nitrate, digested the fused mass in water, filtered the solution, and precipitated and weighed the chromic oxide in the liquid, reduced first by spirit of wine, and then by hydrochloric acid; the difference of the two weighings gave the amount of ash. Another portion of the same chromated gelatine, after drying at 100° C. and exposure, he digested in boiling ammonia so long as the chromic acid appeared in the solution; he then filtered the solution, evaporated to dryness the filtrate (which contained chrome acid and some gelatine), fused it with soda and potassium nitrate, and determined as chromium oxide the chromic acid that was formed in the solution. In this way he determined the amount of chromic acid, chromium oxide, and ash; the remainder would be gelatine.

The results are given of the analysis of three different chromated gelatines, all of which were prepared by soaking gelatine in a saturated solution of potassium bichromate, and then drying. The samples marked *a* and *b* were exposed for from two to three weeks, that marked *c* for five days only, or about one-fourth of the duration of the exposure in the other two cases.

	a.	*b.*	*c.*
Chromic acid	7·03	5·93	1·84
Chromium oxide ...	15·68	12·47	3·36
Ash	2·09	1.81	2·26
Gelatine...	75·20	79·79	92·54
	100·00	100·00	100·00

Chromium chromate is therefore an integral component of chromated gelatine after it has been acted upon by light. That the relative proportion of chromic acid and chromium oxide is not constant need not occasion surprise, for, as has already been explained, chromium chromate is an unstable compound; the amount of chromium in the gelatine varies with the length of exposure to light, and with the duration of the boiling in water to which the product of the reaction has been submitted.

Keeping chromated gelatine for a long time in the dark, or heating it, will render it insoluble, as has already been pointed out, just as if it had been exposed to light; and this phenomenon also depends on the formation of chromium chromate. This fact the author also proved; he took a chromated gelatine of the same kind as those above-mentioned, dried it, heated it for some hours to a temperature of from 120° C. to 130° C., boiled it thoroughly in water, dried it again, and then ignited it; the ash was found to be rich in chromium oxide. Again, a portion of the same gelatine, after being kept for three weeks in a dark room and moist atmosphere, became completely insoluble in boiling water; after removing all the chromic acid that was soluble in water, there remained still some of that substance that could be extracted by ammonia, and the residue, after incineration, also contained chromium oxide, though not so largely as in the other cases.

A remarkable fact appeared to be the invariable presence of chromic acid accompanying the chromium oxide, for that substance is originally added in a potassium salt, and should be extracted in the same form; the chromium oxide must therefore have taken a part of the chromic acid from the bichromate. In order to prove the correctness of this explanation, the author allowed a concentrated solution of potassium bichromate to act at the ordinary temperature on freshly precipitated hydrated oxide of chromium; the precipitate, after being collected on a filter, and washed until the warm water came off colourless, had a brown colour, was free from potassium, and consisted of chromium chromate.

The precipitate was then heated to redness, and afterwards submitted to a quantitative analysis, in which the separation of the two components was effected by means of ammonia; the result gave—

Chromium oxide	65·40
Chromic acid	34·32
	99·72

We see from this experiment that hydrated oxide of chromium when treated with potassium bichromate is converted into chromium chromate. The presence of chromium chromate in the photographic process is therefore easily explained; the chromium oxide produced by the chemical action of light takes chromic acid from the potassium bichromate, which is always in excess, reducing the latter to the monochromate.

Of great practical interest is the solution of the question whether chromated gelatine, after being acted upon by light, consists of a combination of chromium chromate and *unaltered* gelatine, or whether insoluble *oxidised* gelatine remains, and contributes to the formation of the image. In the first case, the part forming the image will possess to a great extent the properties of the original gelatine, but in the latter case, when we study the behaviour of the exposed gelatino-chromate under mechanical and physical reactions, we have to reckon with a new and as yet unknown factor. The author's main object in this investigation was therefore the determination of the composition of the chromated gelatine that had been acted on by light.

He sensitized some fine white gelatine with potassium bichromate, and dried it in the dark room, but with free access of air. He then exposed it for fourteen days, as far as possible, to direct sunlight, and after washing it thoroughly in cold water, he boiled it for eight hours, changing the water often until it became colourless, and collected the splintery and friable mass on a linen cloth. In this condition it was of a greenish brown colour, and when digested with hot solution of ammonia over a water bath as long as chromic acid was given off, it became quite green, and was much reduced in quantity. Hydrochloric acid could not be employed for extracting the chromium oxide, because it dissolved the organic matter as well; on this account the author submitted to ultimate analysis the mass that had been digested in ammonia, first drying it for a length of time at 120° C. The result gave:—

Carbon...	37·52	per cent.
Hydrogen	5·05	,,
Nitrogen	13·10	,,
Chromium oxide	22·68	,,
Residuary ash	2·84	,,

The difference consists of oxygen and a small quantity of sulphur. After subtracting the inorganic components, and calculating the number of parts in 100 of the carbon, hydrogen, and nitrogen, we have the following percentage composition of the organic substance contained in the photographic image :—

	Found.	Composition of Gelatine according to Malder.
Carbon	50·37	50·00
Hydrogen	6·78	6·41
Nitrogen	17·59	17·95

It therefore appears that the organic substance contained in the insoluble image is really unchanged gelatine, which, by its combination with the chromium oxide, has been reduced to the insoluble condition. It should further be noted that in composition with chromium oxy-hydrate, gelatine gives up its water much more easily than when alone.

The conclusion, therefore, that the author arrives at is as follows :—When a mixture of gelatine and potassium bichromate is exposed to light, chromium chromate is produced, and this forms with the unaltered gelatine an insoluble compound. The organic substance which abstracts the oxygen from the chromic acid is not found in the insoluble part. Consequently, the part acted on by light behaves like a compound of gelatine with chromium oxide, and that it is, in fact, such a compound has been already shown.

By studying the action of light on a mixture of chromate and sugar, the author was led to the conclusion that cane sugar, in contact with potassium bichromate, and exposed to the light, is oxidised slowly in the same way as it is rapidly by being heated with free chromic acid. Evidently the reaction with gelatine is of the same kind.

The products of the reaction of potassium bichromate and sulphuric acid on gelatine have been long known ; a very acid liquid distils over, consisting of formic, acetic, valeric, benzic, hydrocyanic, and other acids. The author accordingly sought for these acids in chromated gelatine, after it had been exposed to light. He boiled 100 grammes of the substance (it had been exposed for from two to three weeks) in a dilute solution of potash, filtered, precipitated the chromic acid in the filtrate with baryta water ; filtered again, and distilled the product with sulphuric acid. He obtained a liquid with a strong acid reaction, and possessing the smell of formic acid. He then saturated this liquid while hot, with lead carbonate, and evaporated the filtrate, obtaining by this means acicular crystals resembling those of lead formate, but in too small a quantity to permit of their being analysed. Potassium bichromate and gelatine, when heated with silver nitrate, reduce the latter ; this property, as well as the analogy of the reaction with sugar, convinced the author that, exposed to light, the mixture oxidizes with the formation of the same products as are obtained by heating gelatine with chromic acid. These oxidized bodies do not contribute to the formation of the image, for that consists entirely of gelatine and the simultaneously formed chromium oxide.

Salts of chromium do not at once produce insolubility in an ordinary solution of gelatine ; it first sets and becomes dry. This fact explains why dry films are more sensitive to light than dilute solutions. In the former there is a predisposition to the formation of chromium oxide, which is promoted by its pronenesss to form insoluble gelatino-chromic oxide ; in the latter the chromium oxide cannot cause precipitation, so that there is not so strong an aptitude to produce reduction. With chromated gelatine and with gum arabic the difference in sensitiveness between the moist and the dry film is very great, and it is in these cases that the chromium oxide forms insoluble compounds with the dry substances only. This appears, to the author, to be no accidental coincidence, though the phenomenon itself can only be partially explained.

(*To be continued*).

SPOTS ON EMULSION PLATES.

BY W. H. WILSON.

I feel that it almost needs some apology for troubling you this evening with such a well-worn subject as "Spots on Emulsion Plates," particularly when what I have to say is only in confirmation of what has usually been considered their cause, viz., dust. But it may interest and amuse emulsion workers to hear to what an unlikely and apparently innocent cause I succeeded in tracing that dust.

I have worked the emulsion process for thirteen years, and spots were by no means a familiar characteristic until three years ago, when an eruption suddenly made its appearance, and assumed a chronic form of such obstinacy, in spite of all that I could do, that but for my former experience, which taught me that they were not inherent in the process, I believe I should have abandoned emulsions altogether.

It would be wearying to you to detail the steps that were taken to subdue the enemy. As the conditions of working were apparently unchanged, it was only natural to suppose the spots arose from insufficient filtering, and the changes were accordingly rung on cotton-wool, tow, sponge, and cambric, and these were washed in caustic potash and alcohol, and then the emulsion was allowed time for subsidence ; but all without avail—the spots remained master of the position. It was getting serious, and that finer patience which is such a shining virtue of photographers was nearly exhausted.

One thing was certain, and that saved a great deal of trouble ; for, as I worked with portions of the same substances as I had formerly used, it was clearly owing to some undetected error in my method of working. The only change that had been made was in the introduction into the room of a large paraffine lamp, it being more convenient to me, as regards position in developing, than the gas, and it was also used when coating plates. Knowing what a harmless thing paraffine is, it seemed like going out of one's way to suspect it. Nevertheless the fact remained that the lamp was the source of my troubles, and a few tests confirmed the suspicion. It may be urged that many photographers use a similar lamp when preparing plates, and yet they are not troubled with spots. They are fortunate, but I still think my experience with the lamp may be of service in helping them to guard against danger.

You have probably failed so far to see the connection between the paraffine lamp and the spots. Let us analyse. In the ordinary paraffine lamp, as everyone knows, a chimney is used for the purpose of effecting a proper combustion of the oil ; through this chimney the heated air rushes with considerable force. The column of heated air ascends to the ceiling, and, being impelled forward by the continuous rush of heated air, spreads to the sides of the room, descends, and runs along the floor to the lamp, and thus sets up a circulation more or less active according to the size of the lamp and the room, picking up on its way the particles of dust that, in my case at least, caused the troublesome "emulsion spot." It would appear that the heated air from gas burned in ordinary batswing burners has not the power to displace that in contact with the ceiling, and this explains why, in the upper part of a room, after the gas has been lighted some time, there is such an accumulation of bad air. And it is no doubt better that the bad air does keep to the ceiling ; for if argand burners, which require chimneys, are put on the gas, I am mistaken if the current they would cause would not prevent the accumulation of bad air near the ceiling by driving it into circulation in the room.

Enlightened by my lamp, it was necessary to examine more remote parts of the room, where I had been accustomed to consider the air, and, in consequance, the dust, totally undisturbed. It needed no great acumen to pitch upon a coil of vulcanised india-rubber tubing, which is generally covered with a fine coating of the sulphur used in its manufacture—sufficient of itself to account for the most virulent outbreak of spots. It was a natural transition from this to the pneumatic holder. If these be made, as mine is, with a ball of vulcanised rubber, they must always be viewed with suspicion. The constant pressing of the ball for attaching or detaching the plate must send the dusty particles from the interior into circulation in the surrounding atmosphere. They should be made entirely of pure rubber. As they are exceedingly useful, I now fill mine with water, and empty it before beginning to work.

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* Read before the Liverpool Amateur Photographic Association.

I now breathe freely, and the preparation of good, clean-working emulsion plates is once more as easy as plane sailing. Each batch of plates can be prepared with great certainty that spots will not be among their defects. I conclude by saying that I believe almost all spots—except, of course, those produced by free silver in the emulsion—are caused by dust, and, even in the most inveterate cases, a diligent search will doubtless detect their source, although it may not be a paraffine lamp.

BABY MINE! BABY MINE!!*

No, it was not exactly mine, either; but was a baby that I had often seen pass and stop at my door with its mother, and apparently admire my specimen works of many kinds of faces. It always behaved itself in such a magnificent way that I felt drawn toward it, and seemed to love it as though it really was my own. Those little acts incident to the expression of my admiration seemed also to please the mother as well as the child. But as I am a bachelor, and discovered that the mother, as well as the baby, seemed to admire my attentions. I must confess I was staggered at the "might be," and prudently resolved not to notice the child (or mother) should they appear again at my door. I was really loth to miss the little baby's face, as I had become much attached to it, and many times desired to make its picture, and at last had to give in, and ask its mother for the favour. She, after much pressing, consented to my desire of adding to the already handsome collection of faces of all ages, &c., displayed at my door. Of course this was before I discovered that my attention to the child had somewhat interested the mother. I knew the child's name, having heard her called often by her mother, "Mina." Now, I rather liked the name, and much desired to know the mother's name also; but, with the modesty of a photographer, in addition to my being a bachelor, never dreamed or dared to ask it. After many months of persuasion, I was one day surprised and delighted to find in my parlours Mina and her mother. At last, I said to myself, I will have my desire fulfilled, and make such a picture of a child that it will astonish the world (of photography). After much time spent in preparation, and warning to all the assistants in the gallery, I at last got my baby into something of a nice appearing pose. I need not go into the details of a fond mother's worrying to have "baby mine" (I beg pardon—her baby) look its best, and certainly to look much better than any other mother's baby that I seemed to have the taste to display in my show-cases and on my walls. After being sure nothing more could be done to make perfection more perfect, as it were, I made an attempt, and got a magnificent picture, which the mother insisted could not possibly be so, as the dress and hands were not quite right, for she saw it while being taken, and I must certainly destroy it and make another. It was made again, and again; each time she fancied something must be wrong. Again I tried, never doubting (as who does?) but that I must certainly please her some time, and after the third, fourth, and fifth times, I found magnificent failures. I was sick and wearied, and found I was rather discouraged, I felt, almost for ever in all attempts in the future, to undertake children's pictures. The mother was in despair, and was so anxious that the picture should be good, and excel all those she had seen of other people's babies, that I made a positive appointment with her for the next day, if fine. Meantime, four ladies, two children, and two gentlemen had been waiting, and I actually suppose they thought I swore some when I was in the dark-room, for they said I looked as though I was not well. But I give you my word I don't think I did, very much, and told them so. But later in the day I was very much bothered by the curious looks of my assistants, especially by those of the dark-room operator. When all the customers had departed for the day, he (Harry) looked very sympathetic. "Why, Henry, what makes you look so peculiar?" I enquired. "Why, Mr. Calixtro, I was only admiring your control of features while telling those ladies and gentlemen that you did not swear. Now, don't you really think you did swear, just a little?" I told him calmly, I thought not. "Well, sir, but do you think, if they had been where you and I were (the dark-room), they would hardly have believed you?" "Never mind, Harry, attend to your own business, and control your tongue as well as I do my face, and I'll find no fault with you Remember that 'Baby Mine'—no—no—not mine (thank heaven!)—will be here to-morrow at 10.30 sharp, and we'll try it again. I tell you truly, I wish I had never asked her in, especially a second time." To-morrow came, and with it my—no—not my baby, and after the sixth trial I was in despair, and things looked very blue in regard to getting that child's picture, as the instant it saw me it seemed to remember the day before. I can assure you that by this time I had come to the conclusion it might be any or everybody's "baby," and I don't think I was far from right either, as it was the *mostest* child I ever had anything to do with. Suddenly a bright idea—born, I guess of the swear of yesterday—struck me, and that was, to get the mother to go in to the dressing room and bring out some toys, &c.; and while she was gone I just had time to give the child a drink of water, with a few grains of cyanide of potass dissolved therein, when presto! the child was still as a rock, and I went on and made a magnificent set of pictures of four sizes. The mother, hearing no noise, thought I was succeeding elegantly, and stayed, purposely, away from the skylight, and, I can assure you, I was not bothered once while I made the four sizes of negatives. All were good. When I was through I called the mother, and she somehow or other found out that the child looked funny, didn't move &c.; in fact, was dead! Then I thought I would have as much trouble with the mother to quiet her as I had with the child; but when she saw the beautiful proofs I had made, with every piece of lace and embroidery, &c., on the child's dress, she was entirely satisfied and consoled, and said she never saw such a beautiful dress taken before. I told her I was proud of her criticism, and very much pleased to hear her say so, and at the same time was very sorry the child did not live under the ordeal. At any rate, she had a pretty picture of a pretty dress. I told her the child must have died in a fit, or from some singular cause that I could not explain, such, for, instance, as coming so often to a gallery. She said she didn't care so very, very much for the child as she did for the dress, as she had expended so much time on it. She desired it to be perfect, and as she had procured such a fine picture of it, she was entirely satisfied. I must confess I was astonished, thunderstruck, to hear her so, but I can assure you I was well pleased that she took it so well.

Just here I would ask the question: Who of us (photographers) has not experienced the elysian delights of retaking elegant previous sittings of children almost impossible to get at all, not to take into consideration the reception of them, and numerous friends that find this fault and that and the other, where they are entirely gratis, or cannot be held by any one who will take the trouble to think, and use their brains, to help them see the impossibility of always making as thoroughly fine and artistic pictures of children (bless their hearts!) as can be made from adults?

I have only a few more words to say, as this runs out pretty long, and will become tiresome, and they are, that, after all my endeavours to make a nice picture of "Baby Mine," I found she was the "Other Fellow's Baby" at the corner, a bitter rival of mine, who found he could not make the picture, and desired to give me all the trouble he could, knowing I liked babies, especially "Baby Mine."

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* *St. Louis Practical Photographer.*

The Photographic News.

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THE PHOTOGRAPHIC EXHIBITION.

Our few final words on the Exhibition have stood over from pressure on our space. Our remaining observations chiefly refer to the landscapes, to many of which we have referred already. The landscapes at the Exhibition this year are not characterized by any new features. They are for the most part excellent, but their excellence is not due to any novelty in style, but simply a continuation of the growing excellence which has characterised British landscape work for some years. It was recently remarked, at a meeting of photographers, that the especial phase of excellence which marked the English landscape photographs at the Paris Exhibition was the finely indicated atmosphere which characterized them all. The remark has been often made before. It has been made in relation to English landscape art in paintings, and it has been remarked that it was due to the actual presence of atmosphere in our English climate, which gave a beauty to English scenery which the grandest Italian landsapes entirely lacked. There was a time, however, not many years ago, when English photographic landscapes failed, as most other photographic landscapes failed, in this particular. Technically good photography gave foreground, middle distance, and extreme distance all in due atmospheric perspective; but beyond the horizon a mass of brilliant white or yellowish white paper started forward, and checked the eye which had been wandering away into space by presenting a solid white wall overtopping everything. Photographers whose taste and sense of fitness were offended by these things, and attempted in various ways to remedy them, were checked and derided as violating that sacred thing, "photographic truth." Bolder men gradually came to see that photographic truth was often artistically false, and gradually skies have been introduced, from a second negative if necessary. It was felt that nothing could be more untrue than a landscape without a sky, and that the staring white of albumenized paper, without a trace of gradation of any kind, could never represent atmosphere and sky. And in the Exhibition we do not remember to have seen a single landscape without a sky.

It is of vital importance that the sky and the landscape underneath it should harmonize. The careful observer of nature is familiar with the definite and certain effect produced by the sky on the appearance of the earth beneath. The whole colour of the landscape is changed when a cloud intervenes and hides the blue sky. The blue lights which appeared on green leaves and brown roads disappear, and the shadows grow cold. In the monochrome of the photograph the change is not so palpable, but it is there, and must be rendered. If a cloud negative could be taken at the same time for each landscape, the best results would be secured. In some cases, it will be said, there are no clouds, merely a blue or neutral tinted sky. But in all cases that sky is full of gradation, and the photographic landscape should give such an effect to be true to the landscape. Failing the exact sky, a close observer possessing good taste will select a sky which does not falsify conditions. He will not place sunset clouds over a landscape taken when the sun rode high in the heavens. He will not place dark threatening clouds over a calm sunny landscape. A memorandum of the kind of sky should be made with every negative, and scrupulous care exercised not to "overstep the modesty of nature."

Perhaps, taking the contribution as a whole, the finest landscapes in the Exhibition are those of Mr. William Bedford. They possess almost every desirable pictorial quality, as well as perfect photography. The composition of the picture in every case is marvellously satisfactory; in fact, the pictorial qualities in all cases seem to satisfy artistic law and good taste as completely as if the artist had to design rather than select his subjects. Of Vernon Heath's fine landscapes we have before spoken, as also of the charming small pictures by Mr. Henry Cooper. A. and J. Bool, as usual, show some fine large landscapes. A very pleasing landscape by Captain Verney, "Fountains Abbey," is worth noting, as are Mr. W. J. A. Grant's views on Loch Morah. Mr. W. Wainwright, Jun., exhibits some good views taken on Bennett's plates. It is unnecessary to comment upon Mr. England's very fine series of the French Exhibition.

We may mention amongst exhibitors of good work in this direction not needing special comment: A. Pettitt, E. S. Baynton, R. V. Harman, A. Pringle, E. Brightman, J. Miller, Capt. Rawes, H. Whitfield, E. Fox, W. Vanner, J. M. Brown, and others.

Amongst the contributions on the table, specially noticeable, are the fine stereoscopic transparencies exhibited by Mr. John Harmer. The Woodbury Company also send transparencies which illustrate how well filled for such work is the Woodbury process. Mr. W. Watson's photographic ceramics are very interesting, as are those also of H. A. White.

Perry's cloud negatives are good, but these especial samples have from some accident become granulated in texture, a defect we have not seen in them before. Cowan's electric shutter and Cadett's pneumatic shutter are both excellent, and each deserved a medal. Mr. Hare's revolving albums have been exhibited before. By some accident one of these had got out of order, and the contents tumbled irregularly about.

Mr. J. L. Lane showed some ingenious things in apparatus. An "economical printing-frame," especially designed for carbon work, is very admirable, giving perfectly simple and accurate register for using the tinting screen, or indeed for any form of double printing. Examples of Rouch's excellent patent camera were shown. Murray and Heath's stereoscopes and slides are very fine. The show of mechanical inventions this year is not so large as usual.

PARIS PORTRAITURE.

Two of the best studios in Paris, those of MM. Walery and Nadar, charge two napoleons for a dozen carte-de-visite portraits, and the same prices, we are told, appear to be current with the principal portraitists of the French capital. Reutlinger, who ten years ago was second to none in his charming vignette pictures, and whose cabinet portraits had the same reputation in Paris as those of Fritz Luckhardt enjoyed in Vienna, shows no more so decidedly to the front, from the fact that others of his comrades keep so close up that there is no marked interval between. A guinea for six portraits, carte-de-visite size, used also to be the price with several of our best houses in the metropolis; nay, we believe, one and a-half guineas were sometimes given for half-a-dozen cartes when cartes were novelties; but there are few, if any, who ask and receive this rate now. Thirty shillings for a dozen cartes-de-visite is a general price, we believe, in the case of our first-class firms in town.

Of course, the Paris Exhibition has had a good deal to do with the keeping up of prices during the present year with our neighbours. Foreigners in large numbers have gone over to spend their money, and returned in the full accomplishment of their object. But, besides this, it is idle to deny that the Parisian photographers have secured a name—among Britons, at any rate—for taking better portraits than are to be obtained elsewhere. And the reason for this is not far to seek. The carte de-visite of to-day, beyond being a portrait, is an *article de vertu.* It has about it much that is distinctly manufactured. Its glaze, its gilt edges, its rounded corners, all tend to make it nice, natty, and highly finished. Like other things we usually term *articles de Paris,* it has a brightness and elegance which do not belong to a portrait of larger size. The purchaser wants not only a likeness, but a setting, if it may be termed, which shall show his or her portrait off to the best advantage. This setting is more studied in Paris than in London, and it is the something besides the portrait that fascinates visitors, and causes them to pay twice as much as they otherwise would.

The difficulty is in maintaining a high standard, not necessarily of portraiture, but of the finished carte itself. Plenty of West-End houses have in their time secured high prices, but the majority now-a-days charge but one guinea, or a guinea and a half, for a dozen cartes-de-visite. It may be argued that, after all, there is not much difference between a guinea and a-half and forty francs, and in truth there is not; but whatever it is, balance is slightly in favour of our French neighbours. But it must be remembered we usually get as much in Paris for a twenty-franc piece as for a pound sterling in England; in other words, most people would practically regard two louis in the light of a couple of sovereigns. And again, when we cite a guinea and a-half, it is altogether an exceptional charge for twelve cartes now-a-days, and a dozen for twenty-one shillings, or half-a-dozen for twelve shillings, is a more general charge among first-class houses in town. So that there is not the least doubt about the Paris photographers having the lead.

To compare the prices in New York, and in the States generally, would scarcely be fair, since money does not go so far as with us; in Berlin and Vienna, however, the prices are certainly as high as, if not higher than, ours in comparison. That is to say, taking the cost of living as the standard, you pay quite as much, if not more, for cartes or cabinets in the capitals of Prussia and Austria, than in London. We are only talking, *bien entendu,* of the best class of work. And yet London is credited with being the dearest capital in Europe. Its operas, theatres, restaurants, and entertainments are paid for more dearly than in other Continental capitals; only, perhaps, in the matter of fine dinners and rare wines do the Parisians vie with us as to prices. And yet in the matter of that particular luxury, photography, our city stands behind the others. It is not enough to say that some of the best photographers are not to be found in London, but inhabit the more frequented watering-places, such as Tunbridge Wells, Leamington, Brighton, &c. At the first studios in resorts of this kind, we do not find more than the guinea asked for for the dozen cartes, and certainly the fees are no more than are demanded in Baker Street and Regent Street.

Our Paris brethren, it cannot be denied, are, therefore, more favoured than ourselves. They have the advantage, and they know how to keep it. As we have said, their cartes and cabinets are not portraits alone, they are something more. Their productions are at once more showy and attractive, and they possess that one element which is always taking—*du chic.* Whether it is by an enamelled surface, by brilliant retouching, by cameo stamping, by hot pressing, or stylish mounting, that they secure their end, is no matter, so long as it is secured; and none of us can gainsay the finished and polished aspect which their small portraiture possesses. It is not alone that the photography is good; there is excellence throughout, and the Paris carte is as much a manufactured object as any other French *article de vertu et bijouterie.* The French portraitist combines a variety of means to produce his end. He makes use, probably, of a French artist in posing, who is versed in all the coquetry of his nation, and knows how to set off and impart "go," if one may use a vulgarism, to a common-place costume. He empoys, probably, a German retoucher, who works with a magnifier, and has plenty of patience. He uses English lenses, and has resort, no doubt, to tasteful female fingers for finishing and mounting. Lastly, the high price he charges permits him to pick and choose copies sent out, and allows him without loss to reject rigidly every picture that is in the least degree defective, or does not attain to a fixed standard.

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THE AWARDS IN THE LATE INTERNATIONAL EXHIBITION.

It would seem that we have not yet heard the last of the awards of medals and honorable mentions of the Jury of the Photographic Section. Many of the French exhibitors are still loudly protesting against the injustice and favouritism of which, as they allege, they have been made the victims. At the meeting of the Chambre Syndicale de la Photographie, held on the 12th of November last, M. Berthaud, the Chairman, administered a well-merited rebuke to the remonstrants, expressing his profound regret "that certain exhibitors, who were discontented with the awards that had been made to them, had thought proper to publish their complaints in an unbecoming form." But while finding fault with the manner in which they had made their wrongs known, he seems to have acknowledged, to some extent, that the protests were justified, for at the close of the discussion he expressed the opinion "that the best means of avoiding at future exhibitions reclamations that were more or less justified would be to do away with awards altogether."

Not only, however, is the action of the jury itself sharply criticised; if all we hear be correct, there seems to have been a more powerful authority behind it, by whom its decisions were in certain cases overruled. The *Estafette,* a Paris journal, publishes two letters to a friend in France from M. Levitsky, Court Photographer at St. Petersburg, and Vice-president of the Jury for Photography. As these letters tell their own tale, we translate them without further comment.

"St. Petersburg, October 14th, 1878.

"I hasten to make you acquainted with an extraordinary and almost incredible circumstance that has occurred in Paris. You are aware that M——, a photographer at Warsaw, was to be excluded from any award, on account of his having made a false statement as to the medals adjudged to him at previous exhibitions. Thus, on his signboard in the present Exhibition, he had given himself out as the holder of the silver medal of the Exhibition of 1867, whereas he had been awarded a bronze medal only. After great personal trouble I succeeded on this occasion in securing for him the award of a silver medal. Last week I received suddenly a telegram, from which I learned that M. Davanne, the President of the Photographic Jury, had proposed an amended award of a gold medal for M——, and that my concurrence alone was wanting. Now, the regulations for the guidance of the jury expressly state that their decisions are final and irrevocable. My answer was expressed in this sense. Yesterday, the 13th of October, I received an official notice that M. Simon, the Minister, had held a meeting of all the jurors of other sections of the Exhibition who had remained in Paris. At this meeting the decision of the professional jury was overruled, and a medal was awarded to MM——. I ask, with what right? Gold medals might just as well be awarded to all the other exhibitors! "Levitsky."

"After sending off my yesterday's letter I received a note from M. Davanne, in which he gave me some details concerning the new Court of Appeal which had taken on itself to reverse the decisions of the professional jurors. This seems to have been effected by the Grand Duke Constantine energetically using his influence. It was entirely due to this consideration that M. Simon felt called on to institute a second jurisdiction. When once the new jurors were assembled, the opportunity for revoking still further the awards of the original jury was not allowed to be neglected. In this way, MM. J—— and G—— have had gold medals adjudged to them, though their former awards were of a lower class. . . . I have just received the official list of medals, and am so completely dumbfounded at all that has taken place, that I can scarcely finish my letter. "Levitsky."

A PHOTOGRAPHIC WITNESS.

Photography has occasionally been used by the dramatist and novelist, but not often, and rarely with fidelity and skill. A recent tale of the kind in a contemporary is more effective than usual. It tells the story of one Dan, a singular lad, who cannot be brought to work in harness, as he is fond of study and experiment. Amongst other things, he becomes an ardent amateur photographer. He is becoming the despair of his friends, to whom he appears lazy, eccentric, and shiftless. We quote the close of the story, telling how Dan's photography proved useful to others and beneficial to himself:—

"About this time a trial was in progress at the court. A man was charged with passing a forged cheque at the bank. The teller fully identified the prisoner, described his movements, and related what was said between them at the time with the greatest minuteness.

"On the other hand, the accused indignantly denied the charge, and protested that he was not in or near the bank at the time alleged, but in the office of a friend on B street. He remembered his whereabouts, for his arrest was not long after the forged check, and all his movements on that day remained distinctly in his mind. From the first he had continued to assert his innocence, and declared the teller had mistaken him for some other man.

"Unfortunately for him, he was obliged to admit that he was alone in his friend's office at the hour in question, and failed to produce any witness beside himself to prove definitely where he was, though he had made every effort to do so. It was a question of veracity, man against man; but the clear and very positive statement of the teller against the accused, and the possibility of some motive presumed to exist in the man's financial circumstances, had decided the direction, considering the interest at stake, to hold him to answer at the next session of the court. And now the day of trial had come.

"Everybody was extremely interested in the trial, for the prisoner was well known in the town, and had always been supposed to be honest. The anxiety was intense to know whether he would be proved a criminal.

"The case seemed to be going against the prisoner, for one or two other persons had been summoned to testify that 'to the best of their knowledge and belief,' they had seen the man in or about the bank at one o'clock on the day when the cheque was passed.

"The prisoner sat in the court room, pale, but with a certain fearless firmness on his features that scarcely seemed like guilt.

"All the known evidence was in, and to the last, save the statements of a few friends as to his previous good character, nothing in his behalf beyond his own unsupported word had been brought forward.

"The prosecuting attorney arose and formally recounted the strong points in the case, dwelling especially on the failure of the prisoner to prove an alibi—*i.e.*, to show to the satisfaction of the court that he was elsewhere than at the bank at the moment of the crime, when suddenly, to the unspeakable astonishment of all present, a queer voice from a distant part of the room exclaimed:

"'But I can tell where he was.'

"Everybody turned to look at the speaker, who was none other than our friend Dan. He stood with his mouth wide open, clutching his cap with one hand, and with the other nervously poking his tousled hair. Everybody laughed.

"'Silence!' roared the crier with a fierce tone, and then, assuming that the boy intended to make sport, he ordered him to sit down.

"'No,' drawled Dan, 'I guess not.'

"Of course, that set the crowd into still louder laughter. The crier made an attempt to get at the boy.

"'Stop!' cried the judge, in a way that was heard in all parts of the room.

"As soon as silence was obtained, he turned towards Dan, who still remained standing.

"'Young man, do you know anything about this case?'

"'Yes, sir,' replied Dan, slowly, 'I know—'

"'I don't want to know that yet,' interrupted the judge; 'come this way, my boy.'

"The shrewd magistrate knew the youngster well enough to surmise that he would neither care nor dare to be fooling at such a time.

"Dan, all stained and spotted, picked his way out of the crowd, and walked forward to the bench. A curious spectacle he was with his uncouth form and dress, and his mass of white hair.

"The judge leaned forward, and said something to him in a very low tone, and then Dan whispered back to the judge. Soon the people saw the judge smile and nod his head.

"'Ah!' said they one to another, 'our Dan has turned up something new. It's just like him.'

"Their surmise was turned to certainty when the judge announced, 'This young man will produce important evidence for the defence.'

"Dan made his way out of the court-room, and disappeared; in ten minutes he came back again breathless. He had never been known to run before.

"In his hand he held a paper as large as the cover of a geography. This he handed to the judge. He looked at it curiously; then at the prisoner. In a moment, he said:

"'Clerk, administer the oath to this boy.'

"Dan was sworn.

"I cannot repeat his testimony here, but be sure it was drolly worded and disjointed enough. It made everybody laugh, even while it interested them profoundly. The substance of it was that on the day when the forged cheque was passed, he was taking photographs between the hours of twelve a.m. and three p.m. Among other pictures he made one of a man standing in the window of a building on the opposite side of the street. The man that he photographed was the prisoner at the bar.

"Immediately there was a general buzz in the court. The prisoner's pale face flushed, and he gazed upon Dan with a look of joyful gratitude.

"But there was still a very important question to be settled.

"'At what time, exactly, was the photograph taken?'

"Dan took the picture, and looked at it closely.

"'There's the clock on St. Luke's church up in the corner, said he, pointing to the place, and handing the picture to the judge.

"'By the dial here,' said the judge, 'it was just one o'clock at the instant when the picture was taken.'

"The jury and the council now examined the photograph minutely. It could not be disputed; there was the identical man, and therefore he was not in the bank at the moment when the forged cheque was passed.

"The teller was once more placed upon the stand. He was confused by the evidence he had heard, and was by no means as positive as he was before. At last he reluctantly admitted that he might be labouring under a mistake. And upon that he retired into the crowd with an appearance of great chagrin.

"Dan's triumph was complete. He was a hero. People forgot his strange dress and his wild-looking head, and actually 'lionized' him. The prisoner was discharged. He instantly went to Dan, and, seizing both of his hands, exclaimed:

"'You have saved me. You shall have anything you want. I cannot do enough to show you my gratitude.'

"From that moment Dan's star began to rise. He had money to continue his experiments, and he eventually discovered a process by which he succeeded in obtaining the richest and most durable photographs that are now taken in Wexford. He still keeps the old camera that made his fortune."

CHRISTMAS, NEW YEAR, AND EASTER CARDS.

BY THE OLD HAND.

During the last few years there has been a rapid and still increasing desire on the part of the public for Christmas, New Year, and Easter cards. There are many photographers who might give some attention to this, and, as Iago says, "put money in their purse." It is true that a large and profitable trade is carried on by several London experts, who employ many hands and some clever heads, to produce effective work from original designs; but, at the same time, it must be borne in mind that such productions, however good, are of general interest only—will do for anywhere or everywhere—but at the same time are not of a local character, and to this the attention of photographers is directed; and many who have a little spare time and aptitude in the matter may produce designs for Christmas, New Year, and Easter cards, marked by some local interest or bearing, that dwellers in their various districts would be ready to purchase at such festive seasons, and forward the same to their friends. There are few places without an old market house, ancient church, wayside cross, castle, ruin, or other object of interest that could be introduced in the centre of a card, in any convenient shape or form, with appropriate lettering, such as, "A Merry Christmas," "Happy New Year," and "Good Wishes," &c. All this could be varied and carried out according to the skill and taste of the photographer, who will have but little trouble to make and arrange a design if he can use the pencil and brush; if not, he may readily get the assistance of some friend who can. There are numerous old prints and vignettes by Stothard, Westall, and others, that could be looked up, and would come in well for initial letters or other ornamentation, to assist and set off the local centre-piece.

There are also many of the old dot and stipple subjects engraved by Bartolozzi from the designs of Kaufmann and others, that might be used, as well as some old portraits in ovals and circles, with much fancy ornamentation to the same. The following method of preparing a design for a card has been found to answer very well:—Sketch the design (twice as large as the card required) lightly on a piece of white hard paper—Whatman's thin drawing—leaving a space in centre for the photograph of some local view or object of interest; then work up the lettering, border, &c., with ticket writer's ink; when dry, paste it down on a sheet of glass or wood, and put in the centre; clear out all pencil marks, and see that all the lines, ornaments, letters, &c., are unbroken and quite black, thick, and strong (weak, fine lines will not answer in printing the subject); when economy is needed, very presentable effects may be obtained by printing on cards or paper prepared with the mixture used in the cyanotype process that has often been explained in the News, or the uranium and copper process, doing without any nitrate of silver. The "Photogenic Drawing," as explained last year by Dr. Diamond, might also be made available. In brief, it is quite as much within the photographer's province to produce Christmas, New Year, and Easter cards as portrait cards; and as popular portraitists in the West announce the sale of cards in packets of one dozen, with thousands to select from, the movement appears to be a judicious and profitable one, and well worth the attention of many working photographers.

PHOTOGRAPHIC ENGRAVING.

BY CAPT. J. WATERHOUSE, B.SC.[*]

Owing to the imperfection of photographic appliances in those early days of the art, the results obtained by Niepce could not have been very satisfactory, but with better appliances the same process has yielded in the hands of Niepce de St. Victor, the nephew of the inventor, Amand Durand, and others, results which prove its practicability and its capabilities for reproducing images direct from nature, or for copying fine line engravings and similar subjects, for which latter it is much better adapted.[†]

A process on this principle has been very successfully used at the Imperial State Printing Office, Berlin, for the engraving of plates for bank notes and other purposes, and I have also tried it myself with fair success.

The following outline will give an idea of the operations.[‡]

A perfectly smooth copper plate, having been thoroughly cleaned and polished, is coated with a solution of asphaltum in turpentine, to which a little oil of lemon is added. It is then carefully dried in the dark, so as to preserve an even coating, free from dust.

The image may be impressed upon the sensitive surface by sun-printing through an ordinary negative on glass, but as there is by this plan great risk of losing perfect sharpness by want of close contact between the glass and the copper plate, it is better to remove the collodion film from the negative, and transfer it on to the surface of the asphaltum, so that it may be in absolute contact with it all over, and thus secure the utmost possible sharpness of the image. The collodion film is loosened from the glass in an acid bath, containing one part each of sulphuric and acetic acids in 320 parts of water, and the transfer is then effected in a bath of one part glycerine and four parts of water. The transfer film being dry, the plate is ready to be exposed to light, and, as the asphaltum is not very sensitive, the exposure is somewhat long—extending from six to thirty-six hours; but it is better to over-expose and to work in diffused day-light, rather than in the full sunshine.

When the plate is judged to have been sufficiently exposed, the collodion film is removed, and the asphaltum surface is rubbed lightly with a tuft of cotton dipped in olive oil, to which, after a short time, a little turpentine is added. The image gradually begins to appear, and by degrees the unaltered asphaltum is all removed, so that the design appears in clear brown upon the polished copper. The plate is then washed with soap and water, and allowed to dry.

The next operation is the etching or biting in of the image. The back of the plate having been well coated with a thick varnish of asphaltum, to protect it from the action of the acid, the plate is plunged into a trough containing a mixture of—

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[*] Continued from page 557.

[†] See '*Traité pratique de Gravure Héliographique sur Acier et sur Verre*,' par M. Niepce de St. Victor.

[‡] Full details will be found in my *Report on the Cartographic Applications of Photography*, p. 79

Chlorate of potash	... ...	1 part
Muriatic acid ...	... ...	10 parts
Water ...	... ...	48 ,,

and allowed to remain till the weakest lines of the drawing begin to appear. It is then well washed, and the asphaltum covering the lines is removed with benzole. The design will now be seen standing in a slight relief, and an electrotype must be made in order to obtain a printing-plate, from which impressions may be taken in the ordinary way. The sharpness of the lines is better preserved by making a relief and electrotyping, than it would be by biting in.

The best results by this process are obtained from subjects in line, and even with these the operation of "biting in" demands a little manipulative skill. Good results have, however, been obtained in reproducing half-tone subjects, but they require the greatest skill on the part of the operator, and generally much retouching by a practised engraver.

A modification of Niepce's process, by which good results have been obtained, has been introduced by M. Négre. It is briefly as follows:—

A plate of steel is covered with a coating of bitumen or bichromated gelatine, and exposed to light under a negative. After development by a suitable solvent, which removes the parts not acted on by light, the plate is placed in a solution of gold, and, by means of a galvanic battery, a thin regular coating of gold is deposited on those parts which present a clean metallic surface; the remainder of the sensitive coating is then removed, and a beautiful damascened design in gold is obtained. The gold adheres well to the metal surface, and, as it is not attacked by the etching liquid, the design may be etched without injuring the ground of the plate.

This process also appears only suitable for line work, though it is said that satisfactory results in half-tone have been obtained with it.

M. Baldus, of Paris, is said to have used a similar process, but to have etched his plates in a solution of sulphate of copper by attaching them to the positive pole of a galvanic battery.

The processes dependent on the use of asphaltum are all more or less slow and uncertain in practice, and if not already quite abandoned in favour of the quicker and more certain processes dependent on the use of gelatine and bichromate of potash, are rapidly becoming so, especially as their usefulness is almost entirely confined to reproducing subjects in line. Exceedingly fine results can, however, be produced in this manner, and it is particularly valuable in cases where an "etching" or "biting in" process is required, because the bitumen forms a much better "resist" for the acid or etching liquid than does gelatine, as we shall now see.

(*To be continued.*)

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Correspondence.

THE RECENT MEDAL AWARDS.

Sir,—I forbear making any remarks as to Col. Wortley's criticism of my seascapes, and wish to state that whatever my private opinions may be of the gallant Col.'s own work in this direction, I do not elect to air them in a public journal.

A few words are, however, necessary, respecting the particular copies he mentions, which were required for his friend in the country, and about which he (Col. Wortley) asks the aid of the London Photographic Society. The prints were procured in this wise. A special messenger was sent down in hot haste to my printing works for a set of the photographs in question, with instructions to say they were for a "gentleman going to India," and unless they could be delivered at once, they would be no use. In my absence my assistants sent him the only prints that were available; two or three of them being trial impressions as to whether double printing would improve them or otherwise.

I heard nothing more of the prints until Col. Wortley's name appeared in connection with them. I should, of course, have much preferred to have sent prints in every way similar to the ones exhibited, had reasonable time been given for their production.

In conclusion, I may inform your readers (I have it on good authority) that Col. Wortley has really no *sole right* in the production of seascapes, and that any photographer is at liberty to produce them, providing he has courage enough to submit them to the criticism of the gallant Col.—Yours truly,

Payne Jennings.

Sir,—I had not any intention to impute deception to Mr. Jennings. Directly after the meeting I wrote to the President, asking him to tell me who assured him. He declined to tell me. Feeling it a matter of public importance that such a statement should not go forth uncontracted, I called attention to it through the press.

I beg, therefore, Mr. Jennings to dissociate my action from himself personally, and to believe that I raise the question on public grounds solely.—Yours, &c.,

H. Stuart Wortley.

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Proceedings of Societies.

Liverpool Amateur Photographic Association.

The annual meeting of this Association was held on Thursday evening, the 28th ult., at the Free Library, William Brown Street,—Mr. Thomas Clarke, Vice-president, in the chair.

The minutes of the previous meeting were read and approved.

Messrs. H. Norwood Atkins, T. W. Bruce, E. Bucknall, and Dr. Kenyon were elected members of the Association.

The Secretary then read the following

Annual Report.

The prosperity of our Society still continues, and though this is the fifteenth annual report, there is no falling off in the number of its members, which is now sixty-three.

The meetings have been well attended, more especially when any practical illustrations have been announced, showing that, however interesting it is to hear a paper read on photographic subjects, it is still more so to be able to see the practical demonstration of them.

At the close of last year the Association joined with about twenty-two other societies in an associated *soiree* at St. George's Hall. The result was such a success that a general desire was expressed that another should be held this year. This was found to be impracticable, but the hall has been secured for the 19th February next, when it is hoped that a *soiree* more attractive and interesting than the last may be held.

The numerous dry processes have been well illustrated by different members, but the past season has shown the marked advance in the use of gelatine plates by the numerous specimens exhibited at the meetings.

Several papers have been read by the Rev. H. J. Palmer, which have no doubt attracted attention to the value of gelatine, viz.:—"A Further Improvement on the Gelatine Process;" "Cardboard Slides for Gelatine Films;" Practical Demonstration of Palmer Films;" "Switzerland, from a Photographic Point of View;" and "A New Cure for Blurring."

Mr. Kirkby read a paper on "Recovering Waste Silver in Printing," and Mr. Wilson will read one on "Spots on Emulsion Plates." In addition several novelties have been introduced by Messrs. W. J. Chadwick, Houlgrave, Ellerbeck, and others.

The Society's lantern has been much appreciated, and proved an attraction. By the addition of Chadwick's oxygen generator, Mr. Weber was enabled to illustrate Mr. Palmer's paper on "Switzerland," from a photographic point of view, most effectively.

The report would be incomplete did it not record the pleasant visit of several of the members of the Manchester Photographic Society to one of our meetings, who showed us several very interesting novelties. Some of our own members also made a return visit to Manchester, bringing back with them very pleasing reports of their hearty reception. These friendly meetings caused a desire to meet again on an outdoor excursion, and the result was a most enjoyable day spent together at Hawarden. Our own members had previous to this held an excursion to Speke Hall, which, notwithstanding the unpromising weather, proved a success, and Mr. Potter had the pleasure of carrying off the album which Mr. Forrest had kindly offered as a prize for the best negative taken that day.

The thanks of our Society are due for the presentation to them of the *Autotype Notes Bulletin Belge, Journal of the Photographic Society*, and also to the Edinburgh Photographic Society for their presentation print.

The Secretary then read the Treasurer's report, showing a balance in favour of the Association after paying all expenses, which, after being audited, was, together with the Secretary's report, duly passed.

The undermentioned officers were then elected for the year 1879:—

President.—Thomas Clarke.

Vice-Presidents.—J. H. T. Ellerbeck and W. Horsman Kirkby.

Treasurer.—A. Tyrer.

Hon. Secretary.—Wm. Murray.

Council.—Wm. Atkins, Rev. T. B. Banner, J. A. Forrest, Wm. King, Rev. H. J. Palmer, E. Phipps, W. E. Potter, E. Twigge, J. W. H. Watling, Ed. Whalley, H. A. Warmby, and W. H. Wilson.

Mr. W. H. Wilson then read a paper on "Spots on Emulsion Plates" (see page 580), after which a discussion followed, in which Messrs. Boothroyd, Palmer, and Twigge took part, t being the general opinion that no spots resulted from an enclosed paraffine lamp.

Mr. Potter exhibited his album, which contained a collection of prints with some very fine natural sky effects.

Some exceedingly successful photographs of children, taken in an ordinary room, and some taken out of doors of animals, on Swan's plates, caused considerable attention and inquiry respecting exposure, &c.

The Rev. H. J. Palmer then gave a very successful demonstration of enlarging with the lantern, and afterwards developed the resulting negative and some transparencies with the ferrous oxalate developer, using a fine specimen from one of his film negatives to enlarge from.

Mr. Wilson said he was always pleased to find old members still taking an interest in the Association, and it was with pleasure he welcomed back Mr. Guyton, who had formerly held the office of hon. secretary.

Mr. Guyton briefly thanked the members for their kind greeting.

Hearty votes of thanks were then passed to Mr. Wilson and Mr. Palmer for their contributions to the interest of the meeting, and to the various societies who had presented their journals and prints to the Association.

The meeting was then adjourned until the last Thursday in January next.

Amateur Photographic Association.

A council meeting of this Society was held on the 19th inst., Sir Antonio Brady in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—G. G. Baker Cresswell, Esq., Rev. R. O. Yearsley, M.A., J. C. Hannynton, Esq.

The Secretary then read several letters from members expressing their satisfaction at the prizes received by them the previous year, and also a letter from Mr. Gunyon stating that he had had nearly fifty negatives spoilt by bad varnish.

The Secretary mentioned that he had brought this letter specially before the notice of the Council because he had received several communications from other members complaining of the same thing, and that he himself had been greatly troubled in like manner.

Mr. Glaisher suggested that the fault might be in the *collodion* rather than in the varnish, and after a careful examination of several negatives it was the general opinion of the meeting that Mr. Glaisher was correct in his surmise.

The Secretary then laid before the Council the prizes which were awarded at the annual meeting, which were as follows;—Three silver goblets, two elegant illuminated portrait albums, and six oil paintings in gilt frames. These having been approved by the Council, a vote of thanks to the Chairman was proposed by Mr. Howard, seconded by Mr. Gooch, and passed by the meeting. A. J. Melhuish, Hon. Sec.

Talk in the Studio.

Photographic Society of Great Britain.—The next meeting of this Society will take place on Tuesday next, December 10th, at the Gallery, 5a, Pall Mall East (the Winter Exhibition of the Water Colour Society being on view), when the following papers will be read:—"An Emulsion Process," by Henry Cooper; "Case of the Destruction of the Latent Image on Washed Emulsion, and a Method of Revising the Image," by Leon Warnerke; also a "Practical Demonstration of the Working of his New Platinum Process," by William Willis, Junr.

Intense Light for Taking Photographs.—Mr. Thos. C. L. Lempriere, a photographer of Wiveliscombe, sends us the following:—"Thinking this might be useful to some of your readers, I send it as it was sent to me from a friend in Texas, A very brilliant, perfectly white, and very actinic light, which may be used (says the *Scientific American*) for taking, photographs, is produced as follows:—Place some perfectly dry powdered nitre in a suitable clay vessel, and in a cavity made in the middle of the powder place a piece of phosphorus and ignite it. While it burns the nitre melts, and a quantity of oxygen gas is given off, producing an intense light. N.B.—Phosphorus must be kept and cut under water."

The Pope's Epigram.—A correspondent sends us the following literal translation of the Pope's lines in a recent issue entitled—

ARS PHOTOGRAPHICA.

Drawn by a dart of the sun,
Beautiful picture, how well
The honour of the forehead, the fire (or power) of the eyes
Dost thou bring back, and the favour of the mouth!

Oh, wonderful virtue of genius!
And new miracle! Image
Of Nature, Apelles, emulous,
Not a lovelier could paint.

Dry Plates for Portraiture.—We are favoured by Mr. Henry Dixon with a couple of portraits, in all respects, save one, the same. The first was produced by the ordinary wet process, and received an exposure of seventy-five seconds, and is much under-exposed. The other was produced on one of Swan's dry plates, and received an exposure of thirty seconds, and has the effect of having received fully fifty per cent. longer exposure than the first. They were both taken at the same time, three o'clock on a dull November day. This is good news for portraitists in dull weather.

Photographs of Cyprus.—Mr. John Thomson, F.R.G.S., Author of "Illustrations of China and its People," &c., had the honour of submitting his photographs of Cyprus, by request, to the inspection of the Queen. Her Majesty expressed her high approval of the series that will form the illustrations of his forthcoming work, entitled "Through Cyprus with the Camera, in the Autumn of 1878;" and a copy has been ordered for the use of the Royal Library. The book will be published by Sampson Low and Co.

Printing Frames.—Mr. Hemery, writing respecting the printing frames introduced by him to the notice of the South London Technical Meeting, informs us that some technical difficulties in the manufacture have hitherto prevented the manufacturers, Messrs. Marion and Co., from bringing the frames under the attention of the profession, but that details having been now perfected, announcement will be immediately made in the columns devoted to trade matters.

Mr. Gladstone's Idea of a Photographic Puff.—In the course of his speech at Woolwich on Saturday, Mr. Gladstone is reported as making the following remarks, which were received with frequent bursts of laughter:—"I was in the Isle of Man a few weeks ago, and I saw on the walls from an enormous distance a placard, I should think six or eight feet long, and on this placard I only saw a very few words in immense letters of red ink. This was the first word, 'Visit,' and the next words were 'of the Earl of Beaconsfield,' and the concluding words were 'to Douglas,' which is a town in the Isle of Man. The consequence of this placard was that everybody said, and I found the idea prevailing in the island, that Lord Beaconsfield was going to visit Douglas, in the Isle of Man. That was what the placard, when you read it from a distance, appeared to assert. But I was rather more sceptical than a portion of the inhabitants of the island, and I went up to the placard, and when I got near it I found there were considerable masses of black ink between the word 'visit,' and the words 'Earl of Beaconsfield,' and again between the words 'Earl of Beaconsfield' and the word 'Douglas,' and these masses of black ink explained that it was the puff of a photographer who had made a visit to Douglas himself, and who alleged that he had photographed the Earl of Beaconsfield, along with a great many other notorious persons, among whom, I recollect, the Rev. Mr. Spurgeon; Mr. Henry Irving, the actor, the justly respected and much-admired actor; the Claimant, who is now in Portland prison; and, lastly, your humble servant. Now, that photographer did not tell a lie. There was a visit; there was an Earl of Beaconsfield; and there was a Douglas in the Isle of Man; but by the way he adjusted his paragraph he made the people of Man believe that the Earl of Beaconsfield was coming. He thought he would thereby draw them to read his advertisement, and then they would come to him to be photographed."

To Correspondents.

*** **The Year-Book of Photography for 1879.**—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue, we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

A. A. C.—Gelatine emulsion plates may be developed either by means of the alkaline pyrogallic acid, or by the ferrous oxalate solution. Details have appeared several times in our pages within the last few months. For the first method, first make 4-grain solution of pyro; then a solution of ammonia, half an ounce (at ·880) in eight ounces of water; next a solution of bromide of potassium, 180 grains in 8 ounces of water. After soaking the exposed plate in distilled water, then apply an ounce of the pyro solution, to which half an ounce each of the ammonia solution and bromide solution have been added. This method is subject to various modifications which we have described. You will find full instructions in our forthcoming Year-Book, and also in Captain Abney's work on emulsions. We cannot, in this column, enter into fuller details. Fix in hyposulphite of soda.

A. J. F.—Many articles on producing collodion transfers have appeared in our back volumes and Year-Books; but we do not usually repeat articles on established processes unless, for some reason, the subject is brought under especial attention, or there are some alterations or modifications to point out. The process generally is just the same as that employed in producing transparencies on wet collodion, using, however, special care in developing. The right method can only be mastered by practice, bearing in mind that an image to be viewed by reflected light is required, not a buried image, which will appear all right by transmitted light. Take care not to over-develop. Tone with a neutral solution of chloride of gold of about four grains to the ounce. Transfer to prepared paper. Let us know what especial parts of the operation you require information upon. We shall with pleasure help you out of difficulties in this column; but the space we can devote to answers is insufficient for describing in detail the whole of the operations.

J. Lord.—Many thanks for communication. Registrations are effected as soon as convenient after they are received; but notices in the News appear at intervals, as space may permit.

Lieut. Erin.—We should select the section marked No. 1; the elevation as shown at No. 3 seems good. On the question of grooving the sash bars for the glass, we can scarcely give you a certain opinion. A practical builder can advise you more safely. We have not found leakage at the sides where the glass has been well bedded with putty, and then all well painted; the glasses having also a good lap. Much depends upon the angle of the roof. It is difficult to keep a roof which is too flat from leakage, but if the angle be sufficient to give the water a good fall, so as to run freely away, it will rarely leak if anything like properly glazed.

Anxious Enquirer.—The coloured portrait presents a difficult problem to solve with any degree of certainty; especially with absence of any knowledge of its history and treatment. The defects it presents are not like fading as ordinarily understood, or from causes commonly in operation. At first sight it seems to suggest that the pigments employed in colouring it have acted upon the print, as the bleached or fading portions seem to be marked out by the action of the pencil, especially in the stippling of the background. Was the photograph mounted by the photographer or by the colourist, or some one else? It seems not improbable that it has been mounted with paste, made, as it often is for various purposes, with the addition of a little corrosive sublimate. This, being acted upon by the slight pressure and prolonged moisture of water-colouring, would bleach the print in this manner. The only case in which we have seen anything like it occurred in a very early experiment of our own. We wished to try the effect of glazing a print on plain paper, and coated it with some albumen containing a chloride prepared for albumenizing paper. This print was subsequently coloured, and in the course of a few months presented an appearance very similar to your specimen. The chloride in the albumen had converted portions of the silver image into chloride of silver, and so spotted it. 2. The plain photograph of the lady shows undoubted signs of fading, and the other has a suspicious aspect of incipient fading. 3. There is no satisfactory test you can apply to ascertain whether a print is commencing to fade, nor any certain method of arresting fading when once commenced. Various modes have been proposed for testing for sufficient washing, but they are scarcely satisfactory. Fading, moreover, is rarely due to insufficient washing. The mischief is more frequently done by imperfect fixation, the result of many causes, such as too weak hypo, or too many prints placed in one fixing bath, or prints sticking together, or being immersed in hypo whilst containing traces of acid, &c., &c. We shall be happy to give further hints or explanations if these appear insufficient to meet the case. We have posted the prints.

Ceres.—By increasing the proportion of silver, greater intensity is gained. All dry plates take a longer time to develop than wet; the length of time it is difficult to say, as much depends on subject and lighting. Give sufficient time, and have patience. 2. Ordinary commercial cyanide is generally more or less adulterated.

A. J. F.—A pyro developer generally gives a better tone for the collodion transfer than iron. Two grains of pyro, one of citric acid, and a drachm of acetic acid, will give a good result. Experience, only to be gained by practice, is of more importance than special formulæ. Toning with gold is important in giving colour and brilliancy. 2. Various modes of transferring the film to paper are practised. Begin with very perfectly cleaned plate glass. Having toned and washed well, wet the transfer paper and place carefully on the film, using a squeegee to remove air-bubbles. When dry, the paper will leave the glass and bring the film with it, and have a glossy surface. There is no work devoted to the subject.

P. H. D.—They are taken with a black background, and a vignetting screen of suitable size, either in the camera or larger between camera and sitter. A full description would occupy too much space for this column.

Desideratum.—The warmth of the solution, and insufficient acid in the silver bath, are the primary causes. Possibly a little light had reached the paper, possibly developing glass not quite clean. Examine for possible fogging or reducing causes.

Client.—So far as we remember, the gentleman named has not published any details of the toning process he uses; but we will endeavour to ascertain, and publish. We should think the acetate but more is due to fine brilliant negatives than any toning formula.

D. White.—Two or three coats of mastic varnish, well drying and seasoning between each. Copal is more brilliant, but is liable to crack.

A. C. Burgess & Norman May.—Will these gentlemen kindly furnish us with there present address. Letters sent to them have come back through the Dead Letter Office.

Charles Wyrall.—In our next.

Several contributors to the Year-Book are thanked for copy received.

Several Correspondents in our next.

The Photographic News, December 13, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Sun Spots and Commercial Crises.—The Legion of Honour and the Paris Exhibition.

Sun Spots and Commercial Crises.—We have not yet arrived at all the sun spots can teach us, it appears. "Sun-spots and Famines," which has been so much discussed of late, is only the commencement, apparently, of what is to come hereafter. We have it now upon record that the failure of the Bank of Glasgow might have been foretold if astronomers had but done their duty; while according to Professor Jevons, on fourteen previous occasions astronomers have failed to do their duty. At Pendleton, last month, Dr. Roscoe lectured upon the Sun, and on that occasion he stated, on the evidence of the learned professor, that since the period of the South Sea Bubble and the present time—an interval of 157 years—there have been fourteen periods of commercial crises, and these it was sought to connect with periods of sun spots in activity. So that, in a word, we shall have to come back to the old times when people went to consult the astrologer as to their good or bad fortune. The occupation of astronomers will become a lucrative one, and, as the latter can do nothing nowadays—at any rate, in the matter of recording sun-spots—without the assistance of photographers, we are all naturally interested in the anticipated good-fortune. If commercial crises can be anticipated, many will be able to put their money safely away until the period has passed, while depositors of small amounts will take care to withdraw their savings during the eventful moment. Moreover, if sun spots affect commercial matters, are they not likely to act also upon others which concern mankind? For instance, the Blackheath burglaries, or winners of the Derby, may be controlled by the same agency; and if the secret of the latter can only be found out by astronomers, there is plenty of profit in store for them. The price of oysters and the plethora of novelists—especially among ladies—we should not be surprised to hear depended also in a great measure upon what temper the sun happens to be in, and it is not only hay that is influenced by the sun shining. There are two points which have, however, occurred to us in respect to commercial crises and sun-spots upon which we would like to see further discussion. In the first place, are the records of sun spots for the past century and a half been kept with sufficient accuracy to permit of any even approximate deductions being made?—and, secondly, have the affairs of other portions of the world been as intimately studied by the statician as England and her South Sea Bubbles seem to have been? If sun spots interfere with commercial prosperity in one part of the world, why should it not be so in the other? And he would be a deep student of business matters who had made himself acquainted with the periods of business success and failure throughout the globe. What would a Frenchman or an Italian say to England being considered the only important commercial centre worthy of study, leaving out of the question America and Australia, which, for the past half century, at any rate, deserve recognition? The other point is more important still. Until daily photographic records were taken of the sun's surface, there were but imperfect means at our disposal for judging of the size and nature of the phenomena we have chosen to term sun-spots; and even when the observatory at Kew initiated the work of taking a solar photograph daily whenever the sun was visible, the results, valuable and important as they were, left much to be desired as scientific records. Indeed, it is only since M. Janssen set up his tents on the *Buttes Montmatre*, in Paris, and put in position the apparatus he had acquired for securing records of the Transit of Venus in Japan, that we began to know how properly to produce photographs of the sun; and that savan's recent pictures, which are now daily secured at Meudon, reveal far more than ever a solar photograph did before. In a word, the taking of trustworthy records of the sun—or solar photography, which is much the same thing—is only just now in its infancy; and when we compare results of to-day with those taken ten years ago, what shall we say of optical observations of a century and a half before, secured by different instruments and various observers? We have no desire to appear sceptical in this or in other scientific matters, and we are quite aware, too, that Professor Jevons puts forward his argument in a tentative form; but there has been so much enthusiasm lately on the part of recent investigators, and lofty structures have been built upon such very narrow foundation, that the method of castle-building will fall into disrepute if the architects do not take care. To say that the spots on the sun influence agriculture, by rendering the land more or less fertile, or controlling sun and rain, may be well enough, and we have no objection to carrying the argument farther still, provided the data that exist be trust worthy and sufficient (which we beg leave to doubt); but when from sun-spots and famine we go on to talk upon such artificial questions as commercial crises, the subject becomes a very wide one, and many people would like to have their say. There are such things as chance and speculation, not to use an uglier word, which influence commercial crises in a measure; but, perhaps, sun-spots may work also upon fools and knaves. In any case, we do not think that the world is as yet quite prepared for such doctrines as those of Professor Jevons, or that the judges of the Scotch courts are likely to take into consideration the eruptions upon the sun's face when they have the case of the directors of the Glasgow Bank before them. Nor, we dare assert, will any of the clever counsel engaged for the defence urge this particular reason to justify the directors in the course they pursued. It will take a great deal to convince the public who have lost money in a bank or trading company that the directors were under the influence of the sun, and consequently not responsible for their actions.

The Legion of Honour and the Paris Exhibition.—We are glad to see that Mr. J. H. Dallmeyer has been nominated a Chevalier of the Legion of Honour. We do not know how these honours have been distributed, but, from the fact that the first list forwarded by the French Government to the British Embassy has not been acted upon, there has doubtless been a good deal of hole-and-corner business in picking out names here and there. The fairest way—and, indeed, the only way—that should have been adopted would have been to have acted implicitly upon the recommendations of the French Government. Instead of this, our Embassy, or the Foreign Office, seems to have exercised its influence, and to have only accepted a portion of the nominations. It would be interesting to have a peep at the original list. As it is, some who have received gold medals, and some who have received silver ones, are nominated Officers and Chevaliers, while others, again, who received the highest awards have been left out in the cold. If it really were intended by the French Government to confer the red ribbon of the Chevalier upon every exhibitor who gained a gold medal, why is this not done? We cannot understand upon what plan the selection was made which admits some and omits others; so far, the only conclusion can be that the whole is a bit of jobbery on the part of our Foreign Office officials.

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HOW TO MAKE A HOWARD'S TENT.

BY CAPTAIN ABNEY, R.E., F.R.S.

This summer, wishing to work with wet plates in the field, and at the same time to be independent of a porter for carrying my dark tent, I determined to try and construct one for myself on the same principle as that of Mr. Howard's, having witnessed its extreme portability. This gentleman kindly furnished me with sketches, and also lent me his tent for a model, and the result was that I was able to work eight and a half by six and a half in the field, and carry all my apparatus with me, though it must be confessed that the size is slightly too large if it has to be transported far. For seven by five it is excellent, and can be recommended. I have made two kinds on the same model, one in stuff, and the other in india-rubber sheeting. In the former I used for the outside drab twill; for the next thickness black twill, and for the inside turkey-red calico. This being premised, I will describe next how the tent can be made. A general idea of the tent when finished will be seen in the figure (fig. 1). The tent itself is hung from under the camera legs, and is in reality a bag. In the earliest form the tent was triangular; but Mr. Howard (and I quite agree with him) considers that this shape is not so convenient as a square one, and I have found that the shape I have given my square one is better suited for me to work in than that of Mr. Howard. In the latter the sides slope up uniformly; in mine I have given a bend to the front, in order that the eyes may look down on the plate with greater ease than they can do if the unbroken slope is the front. This extra slope shown in fig. 2 as A B is secured by fastening A and C to the *front* camera legs, and securing B to a cross-piece attached to the hind camera leg. The point D is also attached to another cross-piece screwed on to the same leg. The form of the tent, however, will be better understood when the mode of making it is described. We will suppose we are to make one of stuff. In all cases it must be remembered that half-inch more than the dimensions figured in the drawings is to be left for turning in and binding, and also, except for the bottom, that three thicknesses of material (such as those I employed answer admirably) must be used. First of all, cut out in brown paper the shapes given in figs. 3 and 4, and two of the shape of fig. 2 (figs. 3 and 4 are the back and front respectively, and fig. 2 is a side piece), and then cut out in the material to be used from these patterns. Tack FH and BD together, and BAC to NOP, and BAC of the second piece cut out to fig. 2 with KLM; the points O and L should coincide with the point A), but leave the side EG detached from BD from below Z.

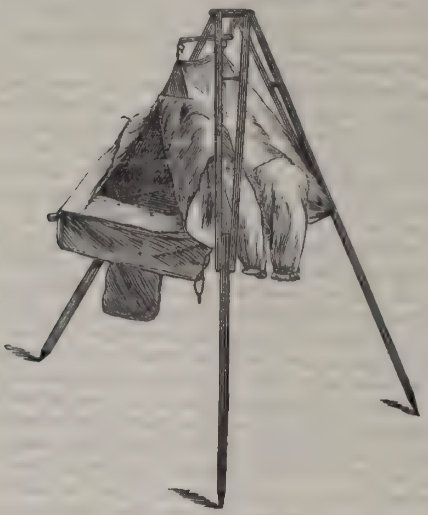

Fig. 1.

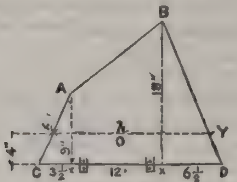

Fig. 2.

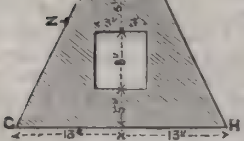

Fig. 3.

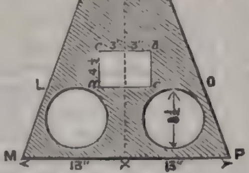

Fig. 4.

Cut out a piece X Y D C (fig. 2), and tack the edge X C to M L, and Y D to G Z, and also Y D on to G E, so as partially to close the side, which is otherwise covered only by a loose flap. Next cut out the bottom (in this case one thickness of drab cloth and one of waterproof sheeting is recommended), which must be twenty-six inches by twenty-two inches, and sew it to G H M P. The main form of the tent is now complete. The left side being open allows access into the interior. It is manifest, however, that the left side can never be light-tight left as it is A band, therefore, four inches wide is sewn along E G, the end near E being cut away to fit the shape of the front, whilst the other end is sewn to the X Y D C piece. Another flap four inches wide is sewn on to the back, one and a-half inches from E G, and parallel to it. When the loose side is now hooked on to the first band, and the last flap is hooked over it again, it is manifest that, as far as the edge of E G of the tent is concerned, no light can enter, since the edge of the loose side is fitted, as it were, into a groove. The same method is adopted for the bottom of the loose side. The interior piece is already present in the X Y D C piece, and it only remains to fix a broad flap some four inches wide from the edge of the bottom piece, in order to make the whole tent light-tight. It will be found that four hooks on each edge—that is, sixteen in all—will be sufficient to close the side. In fig. 3 the rectangular opening in the centre is the window, and should be filled up with adiactinic cloth, or else two thicknesses of red or yellow calico. The two circular openings in fig. 4 are holes in which to place the sleeves. These should be of india-rubber sheeting of about the thickness sponge-bags usually are made. They should be about twelve inches in length, and taper to about four and a-half inches in diameter; the ends of these should be turned over, and a piece of elastic run in and joined, so as to cause the sheeting to fit closely over the wrists. The other rectangular hole is for the mask.

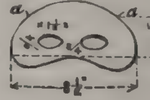

Fig. 5.

The mask is of the shape shown in fig. 5, and it should be made of stout india-rubber sheeting, and faced with black velveteen. A little cotton wool padding introduced between the two to fill up the gap which occurs between the forehead and the bridge of the nose is often useful, as is also a slight pleat made at *a*, in order to cause the top to curve over and fit the forehead. To fit the mask on to the tent a bag is made to fit into *b c d e*, the outside dimensions of which are on the top three inches, and at the bottom half-an-inch. Fig. 6 shows a section of the mask and the front

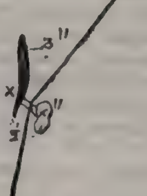

Fig. 6.

of the tent; this may be made of the thicker india-rubber sheeting.

At about four and a-half inches from the left side of the tent, and with the longest side parallel to the side of it, a hole is cut in the bottom to carry a bag, in which the bath is placed. The dimensions must, of course, vary with the size of the bath; but it is convenient to have the top of the bath one inch above the bottom of the tent. In the centre of the bottom, a small circular hole is cut into which is fastened a small brass tube, from which an india-rubber pipe can be fixed to carry off the waste water if necessary. On the right side of the tent is shown another hole (*h* fig. 2), to allow the entry of the pipe from the water-bag. To close this hole round the pipe, I have found that if two patches of india-rubber sheeting be bored to a diameter a little less than the piping, and one be fastened inside and the other outside of the cloth, that all light is excluded. In practice, I have fixed a length of tubing into the hole, of sufficient length inside to carry the water to the plate, and closed by a clip, whilst in the other end is inserted a piece of glass tubing, by which a junction is made with the india-rubber pipe fastened on to the water-bag. A few pockets inside complete the internal fitments. On each side, two sets of tabs are sewn, having two or three eyelet holes in them. The use of these will be shown presently. When all the pieces are tacked together they should be bound with braid, and at each corner strong hooks should be fixed as suspensors for the tent from the camera legs. The top cross-piece (the distance at which it is fixed from the top of the stand must vary with different stands) must be about ten inches long by about three-quarters deep and a quarter wide, and be made of ash or other strong wood; it should be pivotted on to one branch of the leg, and kept in position, when the tent is erected, by a small block screwed on to the other branch. The bottom cross-piece of wood should be about twenty-eight inches long, and, as it is heavier than the top bar, it is convenient to carry it loose, and screw it on by a thumb-screw when the tent is to be erected. It should be rather thicker than the top cross-piece, as it has to bear more strain. Rings such as used for picture frames should be inserted at the ends of these pieces in positions which are self-evident.

The same kind of rings should also be screwed into the camera legs to support the prints M, L, O, and P, to which, as well as to K, M, X, D, and D, it will be remembered hooks are to be attached.

When the camera legs are stretched out the tent will now be complete; but to give stiffness, two iron rods of the thickness of thick iron wire of the length of the bottom of the tent are made with eyes at their ends, and tied to the tabs shown in fig. 2. These help to support the bath, and form a support on which the developing tray can rest.

(To be continued.)

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ON THE RECTIFICATION OF SILVER BATHS, AND OTHER SUBJECTS.

BY W. T. WILKINSON (COLOMBO).

IN the *Pharmaceutical Journal* of September 21st there is a paper, by Mr. W. C. Stables, treating upon permanganate of potash as a water purifier, and proceeding to point out, that although permanganate was very useful in getting rid of many organic compounds in water, its influence upon albumenoid compound was *nil*, and recommending hydrate of potassa as well as permanganate to purify water containing albumen.

Now, as it is very desirable in silver printing to keep the sensitising bath clean and as free as possible from albumen and other organic matter, I concluded to try the effect of Mr. Stables' solution upon my printing bath, and am much pleased with the results, the bath working like a new one after each clearing.

Having a small quantity of negative bath that would not work, and an hour or two to spare, I tried Mr. Stables' solution on it, and again met with success—such success, indeed, that when my working baths are in want of the "doctor" they have a dose of the following solution:—

Permanganate of potash ...	...	1 ounce
Hydrate of potash ...	...	4 ounces
Distilled water ...	...	... 100 ,,

The application is the same as plain permanganate, viz., add until the colour is a permanent one.

What the reactions are I, of course, am not in a position to say; but to any photographer who will kindly look up the article in the *Pharmaceutical Journal*, and give us the reactions, I, as well as others, will be grateful.

I have mentioned above some negative bath that would not work. Now that bath has been the cause of a great deal of anxiety to me, and some loss of time. It was a new, specially-made bath for clouds, and other pictures, and of course worked splendidly at first; but in a day or two *fog* set in, and the bath was neutralised, strengthened, and, after the addition of a little acid, was again in good working order. After the trial plate I could not use the bath for a fortnight, on account of bad weather. Judge, then, my surprise when, again trying a plate, I secured black, dirty, foggy pictures, instead of nice clean ones as before. This was repeated twice more; then I thought something must be wrong, and at last pitched upon my ebonite dipper, which, although perfect below the water line, had the smooth skin peeled off above, and in my outdoor bath this bare part was below the solution when the top was screwed on, consequently the bath was fouled. The dipper was banished, and the bath kept for experiment, as nothing seemed to make it come right until the present time, when it is working splendidly.

I myself shall not very likely have to use the solution again for the bath (except only for the purification of the water), as it is very seldom indeed my bath gets out of order sufficiently to require anything except *cyanide* and *sunning*, so I should like to hear from some one else how it works.

From the bath to the developer is but a natural step, and I again reiterate my partiality for collocine instead of acetic acid. I have tried experiments without number, but the result has always been the best from collocine.

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PHOTOGRAPHIC ENGRAVING.

BY CAPT. J. WATERHOUSE, B.SC.*

Etching Processes with Gelatine.—In 1852, Mr. Henry Fox Talbot brought forward a method of photographic engraving, called "Photoglyphy," which is of some interest as being the first practical photographic process founded on Ponton's discovery of the decomposition of bichromate of potash in contact with organic matter under the influence of light. Talbot found that by the action of light, a dried film of gelatine mixed with an alkaline bichromate became impermeable to certain fluids in proportion to the intensity of the action of the light upon it. He coated steel plates with a thin film of gelatine and bichromate of potash, and after exposure to the light under a photographic positive, he etched the image so produced with a solution of bichloride of platinum, which, penetrating the unaltered gelatine in the parts protected from the light, and attacking the underlying metal, produced the shadows of the resulting picture. Some very promising results were obtained in this manner, and great expectations were entertained of its utility in producing engraved plates for book illustration and other purposes. These hopes, however, have not been fulfilled, and the process, though remarkable as the first of the many valuable methods of photographic press-printing dependent on the use of gelatine and the alkaline bichromates, has inherent defects and difficulties which seem to render it of little practical value.[*]

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* Read before the South London Photographic Society.

* Continued from page 586.

M. Baldus has successfully employed a modification of the photoglyphic process for line work.[†] He coats a copper-plate with gelatine and bichromate, and exposes it under a negative or a positive, then etches in a solution of perchloride of iron, which attacks the copper in all the parts not acted upon by the light, and thus a first relief is obtained. As this relief is not sufficient, the plate is inked in with a printing roller, when the ink attaches itself to the parts in relief and protects them from the action of the etching liquid. This procedure is repeated till the desired effect is produced. If a negative is used, an incised plate is obtained, which may be printed in the copper-plate press. If a positive is used, the image is in relief, and suitable for being printed with type. I have found that the reliefs obtained in this way are exceedingly sharp, though the gelatine films will not stand the action of the etching fluid for very long.

Messrs. Leitch and Co., of London, have lately introduced a similar process, called by them "Photogravure." It appears to be due to M. Garnier, who has had great experience in these processes, and produced some very fine results. The method of working is a secret, but it is said that a metal plate is coated with a sensitive composition capable of resisting the action of acids. The photographic image is impressed on the sensitive surface through a negative, and is then etched with perchloride of iron. The etching is said to be to a certain extent automatic, that is to say, the etching action on the lines ceases at different periods in proportion to their fineness.

Daguerreotype Etching.—Many attempts have been made to engrave the beautiful and delicate photographic image formed on the Daguerreotype plate. Thus, Donné simply etched the image with dilute nitric acid, which attacked the silver forming the shadows, leaving the whites protected by the mercury untouched. Grove etched the plates with the aid of the galvanic battery. Fizeau first etched as deeply as possible with dilute muriatic acid, and then, having filled up the hollows with drying oil, deposited gold upon the lights; the oil having then been removed, the plate was bitten with dilute nitric acid. In order to render the silver plate more capable of standing the wear and tear of printing it was covered with a thin film of copper, which could easily be removed and renewed when required.

Other processes were also put forward, but they all failed, from the difficulty of biting the image to a sufficient depth and of obtaining the requisite "grain" to enable a large number of impressions to be pulled off. None of them seem to have ever come into practical use, and, like the Daguerreotype, they have almost fallen into oblivion.

If, with the superior knowledge and appliances of the present day, any such process could be successfully worked, it would probably offer many advantages over any other etching process, especially for maps and other works in line.

Several ingenious processes of chemical engraving applicable to photography have been proposed by Messrs. Garnier and Salmon, Vial, Dulos, and others; but as they do not appear to have come into practical use, it will be unnecessary to enter into details regarding them. Descriptions of them will be found in Roret's *Manuel du Graveur.*

Though they have the advantage of rapidity, all these processes, in which the image is obtained by etching or biting in with acids or other etching fluids, are open to the objection that for all subjects containing fine and delicate lines, the etching and stopping out require almost the same manipulative skill and care as in ordinary engraving, and the processes consequently become expensive to work. There is also a tendency for the lines to become coarse and heavy. In those gelatine processes in which the etching fluid acts through the gelatine it gradually loosens the latter from its support, and attacks the parts which should not be bitten at all. These defects are to a great extent obviated in the processes we are now about to consider, in which the printing plates are produced by the electro-deposition of copper on the photographic image.

(To be continued.)

THE EXPERIENCE OF AN OLD CARBON PRINTER.

Mr. **Frank Rowell**, of Boston, U.S., is a very skilful carbon printer of many years' experience, having commenced when Swan's process was first introduced. Writing to our Philadelphia contemporary, he says:—

"I still keep up my interest in the carbon work, and read all that is published for or against it, knowing by past experience what is practical, and, using only that which will do the work required, am able to produce results that will please our patrons, and have the satisfaction of knowing that what we give them will remain as they receive it.

"I am aware that many carbon prints have been made that have and will change, but only the fugitive colours that have been used to give the colour of silver prints. India-ink, lampblack, boneblack, warmed with some permanent red or warm brown colour, will give a pleasing colour for any style of print.

"I do not think it best to imitate silver prints. Make the carbon what it is, a distinct style, and let it stand on its own merits.

"A word to any one who is making transparencies for enlarged work. First clean a good smooth glass (plate-glass is the best), and for the final cleaning rub it over with a little talc, only be sure that you leave none of the powder upon the surface. Now coat the glass with collodion, the same as for a double transfer picture; immerse the glass in water; sensitize your tissue after draining as usual, squeeze on to the collodionized glass, put into the drying-room until dry; it will give you a surface, and hold the tissue in such shape as not to break the surface in development, only swelling as much as the collodion allows it to; besides, it is much the easiest way to collodionize the surface of the tissue. After printing, take a glass that has been albumenized, coat with collodion as usual, put the surfaces together, and develop as usual. During hot weather do not use your sensitising solution too strong, or keep the tissue in until it rots it, for then, with other troubles, you will have the whole surface of the print covered with small blisters. Handle your carbon work with as much care as you do other photographic processes. I have seen many specimens of carbon work that looked as if the parties thought it a black, dirty business, and it did not matter much if they did not take as much care to make a good print as they did to make the good negative they had printed from. With the tissue of our own manufacture, we use a two per cent. solution of bichromate of potassa for sensitizing, keeping the solution cool, even to putting it on ice in the hottest weather.

"We send you two prints as near silver colour as we care to see. The red is a preparation of madder, the black india-ink. The one half covered with a mask, has been exposed forty-one days in sunlight, a test that is hard to bear; you can continue the exposure, and report at some distant day how much is left of the same.

"Print No. 3. the tissue was made with india-ink and carmine lake. The print has been exposed fourteen months to a south light.

"In conclusion, I would say I have prints thirteen years old that have not changed at all."

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[*] A full description of Talbot's process, with specimens, will be found in the Appendix to the English translation of Tissandier's "History and Handbook of Photography," edited by J. Thomson.

[†] See the above work, p. 207.

PHOTOGRAPHY—CAN IT BE CLASSED AMONG THE FINE ARTS?

The question is often agitated by originators of art enterprises whether photography belongs to the fine arts. Thirty years ago the Daguerreotype infringed upon the liberal patronage extended to the painters of miniature likenesses, as large portraits were then only indulged in by a few wealthy families. During the past twenty years photography has made wonderful progress, both in popular esteem and in artistic quality, until the portrait painters acknowledge it as a formidable rival. They would fain decry its merits, but their criticisms are constantly disarmed by use in the preparation of portraits. Formerly the artist would secure fifteen or eighteen sittings from a patron, but now the usual custom is to obtain a preliminary photograph, to outline the figure on canvas on an enlarged scale, which is constantly corrected by the callipers, and, after the first sitting for general likeness and colour, to paint the drapery from the lay figure, guided by the appearance in the photograph, so that the man of business or the lady of fashion feels that only time can be given for three full sittings. The painters and sculptors will not accept the photographer as an artist, as they claim that his work is the result of mechanical and chemical processes, and does not depend on the necessary quality of design in all artistic work. Still the best photographers study as critically their composition of groups, arrangements of drapery, and position of the individual, as can any one using the brush, and the very difficulty of arranging the focus for all portions of the body, and the distortion in shape and size, according to the distance from the optical caution. With the advances of the profession, no operator can retain his position in a first-class gallery, for a single week, whose attainments are not greater than a complete knowledge of chemical and mechanical operations.

The want of recognition of photography is a fashion, the relative rank being that accorded in the infancy of the profession, and this is perpetuated by its management as a business. The operators, and even the art assistants in crayon and water colours, are unknown to the public, the work being credited to Black, or Kurtz, or Gutekunst, without any notice of the individual professional talent employed, a system not conducive to the production of individuality of work, only so far as the proprietor of a gallery may have artistic skill, and is thus able to use his several employés as instruments to accomplish special ends. Yet no skill can elevate the work of artisans to lofty standards until they become artists with quickened brains and fresh original ideas.

The press has been forced to draw a broad line between artists and photographers, not alone because of the sensitiveness of the former class, but also from the unwillingness of the latter to submit to the fresh, healthy criticism which the painters must always meet. Like the artists of the whole West, they exclaim that the time has not yet come for a full and free statement of merits and demerits, hence notices can only be given in a general manner, and it is only occasionally that a man can be found who courts the most candid examination and close discrimination of his work. A few months ago the experiment was tried of visiting the principal galleries of Chicago, and while the proprietors would gladly have paid money to obtain flattering notices, yet they instinctively shrank back from the trenchant pen freely employed to review the productions of the artists, and were offended at the plain words of disinterested criticism.

There is very much in the profession of the photographer to command high respect, and it is confessedly so much the popular portraiture of the day, that it is knocking loudly for admission into artistic circles. The display of the American photographers at the Exposition building in this city, for a few days of July, 1874, was one of great interest, though no discrimination was made, and thousands of inferior pictures were displayed. Yet two months later the photographers were reluctantly admitted to a small space in the art hall, and the next year they were excluded altogether. The principle of hanging in the hall of 1874 was the only admissible one in connection with an art hall, for the manager arranged them on the walls according to intrinsic worth and to secure the most desirable general effect; but there was no previous selection, and all were allowed to furnish the same number of pictures. It might seem to many a backward step, and the art committee of another year might feel that it was an ungracious task, since the novelty of the step would provoke much adverse criticism, and few photographers have sufficiently advanced ideas to accord with the scheme; but it might not be a bad movement to make similar advances to photographers as to artists, selecting the best photographers, not alone of the United States, but also of India, Austria, Germany, France, and England, to solicit choice examples of their best work in all departments, and affording also to local operators the opportunity of presenting works of real merit. All the common groups of pictures in one large frame should be positively excluded, both as unartistic in arrangement and positively uninteresting, for if a small picture has merit it deserves to be studied independently, and no multiplication of similar forms can add worth where it does not really exist. Merit should be the only question governing admission, though the space accorded by the art committee would necessarily limit the number of any special class of pictures to be accepted. Variety would be necessary to secure public attention to the collection, and as the prints finished in crayon, or in water colours, or in oils, crayons drawn after photographs, and similar pictures, might properly be included, there would be no reason why this portion of the art display, by judicious pruning and efficient management, might not be made as profitable in developing a love for fine art as any of the departments with more lofty aims.—*Chicago paper.*

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RETOUCHING.—CLEAN GLASSES.

A correspondent of the *Practical Photographer* says:—

"Many retouchers have their light too bright. Have your frame made so as to exclude all light except that coming from front and through the negative. Cover your negative with a piece of cardboard in which a hole one inch in diameter is cut. Adjust the hole to the face of the negative, and you will work easier and can more readily see your work. In bright days I have a glass to put back of my negative prepared as follows:—Prepare a plate as for taking a negative, flow it with collodion, immerse it in the bath, and when fully coated take it out, wash and dry it, then varnish it, and it is ready. You will have a yellow film, which is very pleasant to the eyes when at work. On dark days don't use it. I do not find it well to use a magnifying glass except on small heads. Some cannot work without it. It depends upon the eyes. I have had complaints from some photographers from grinding with resin. Some say it leaves small spots on the negative. I never found any difficulty if the varnish was hard, and I did not rub heavy when grinding. Use good varnish, and I think the trouble will disappear. For health reasons, I have been compelled to disengage myself for a while from photography, yet I feel a great interest in the business, and always shall. I want a word as to glass. Don't ever get out of nice clean glass of all sizes. A lady in my family went to a gallery this week in this town, to sit for a 11 by 14 bust figure. I called shortly after to see the proof and negative. It was taken on a 4 by 4 glass. Upon asking the reason, I was informed that they had no glass cleaned of a larger size. This state of affairs in a gallery keeping four or five hands, and times (as they admitted) very dull! They said they could make a vignette from it the right size. But a small portion of the shoulders showed, and what kind of a vignette it would have been had the lady not sat again I am unable to say. Don't, I beg of you, ever insult our profession by doing so.

"For cleaning glass, get a common scrubbing brush. You will find it nice for removing old film, dirt, &c., from it."

The Photographic News.

Vol. XXII. No. 1058.—DECEMBER 13, 1878.

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PRINTING IN PLATINUM AND OTHER NOBLE METALS.

The demonstration of his new platinum printing process by Mr. Willis, at the Photographic Society, on Tuesday night, was a decided success, and gave very great satisfaction. This method of popularizing a new process is much to be commended. "Things seen," Tennyson tells us, "are mightier than things heard." This is beyond a question true of the manipulations in a new process. However clear and lucid the description may be, the mind fails to grasp and follow reactions with which it is not familiar, and if no demonstration had followed the reading of Mr. Willis's paper, the majority of the audience would have left the meeting but little impressed with the new process. We can scarcely hope to be more fortunate in describing the operations than would have been the reader of the paper if he had not demonstrated as well. We shall, however, briefly describe the operations before the Society, and we hope at least to satisfy our readers that the process is very simple, as well as elegant and effective. It should be added at the outset that a stigma which at the first introduction of the process militated seriously against its success is now removed. In his early operations Mr. Willis felt it necessary, to secure the best results, to use a little silver, and finally to get rid of its remains by the use of hypo. This at once alarmed photographers, and the claims of the new process in relation to permanency were ignored or doubted so long as hypo. entered into the operation. Mr. Willis is now able to secure the finest results without having recourse to silver or hypo. He produces simply and certainly an image in metallic platinum, or gold, or palladium, or iridium, yielding blacks and purples of varying tone, and absolutely permanent.

The process is based upon two or three reactions which it is necessary to understand and remember. First, it is to be remembered that an image formed of finely divided particles of metallic platinum on a white surface will be quite black; an image of gold will be purple; an image of palladium or iridium will be black, each black varying slightly in tone. In all cases these metals are indestructible, either by simple acids, atmospheric action, and all the causes in operation to injure pictures. Mr. Willis's process depends upon a method of producing images in these metals by a simple plan he discovered. He found that the salts of these metals can be reduced to a metallic state by a hot solution of ferrous oxalate in potassic oxalate, and he found also a method of forming an image in the salts of those noble metals.

If ferric oxalate be exposed to light, an atom of oxygen is removed, and it is reduced to the state of ferrous oxalate. Paper coated with a solution of ferric oxalate, and exposed under a negative, yields a faint image of ferrous oxalate. This alone is not of much use. But if the solution of ferric oxalate have a solution of potassic chloro-platinite added, and paper be coated with this mixture, and exposed under a negative, an image of ferrous oxalate is formed as before, and mixed and entangled with it a salt of platinum. Remembering now that this salt of platinum may be reduced to the metallic state by a mixture of ferrous oxalate and potassic oxalate, this mixture is formed and applied in a very ingenious manner. The ferrous oxalate is already formed on the paper, and constitutes the image; if the paper be now floated on a hot solution of potassic oxalate, the mixture of this salt and ferrous oxalate is formed, and at once reduces to the metallic state the platinum which was in contact with the ferrous salt forming the image. A beautiful image of an intense black tone is at once produced, which only requires washing to complete the operations.

Mr. Willis demonstrated in an easy, familiar, and explicit manner, and developed several prints which he had brought ready exposed, before the meeting. The instantaneity with which a scarcely visible image was converted into a brilliant print, like an engraving, excited much interest and applause. We commend to Mr. Willis, or those interested in giving commercial vogue to the process, to give a further demonstration at the South London Photographic Society, where, if the subject have been duly announced, a large and interested audience would doubtless be gathered to witness the elegant and ingenious operations.

Critical Notices.

LETTS' DIARIES FOR 1879.

These well-known diaries, which have for so many years borne the palm for every form of excellence and convenience, are again issued in every size and style, from the memorandum for the waistcoat pocket to the folio rough diary for the desk. All praise of the unrivalled completeness of these pocket-books and diaries would be superfluous.

THE MAGIC LANTERN MANUAL. By W. J. Chadwick. (London: F. Warne and Co.)

Mr. Chadwick's name is not unknown to readers of the Photographic News, who are familiar with his practical ingenuity in connection with the lantern and lantern appliances. He has here produced a manual singular for its completeness and fullness of information, made more attractive and clear by a hundred illustrations. Many valuable photographic hints in relation to the lantern will be found useful to experienced workers, and the book is a perfect *vade mecum* for the beginner.

THE PRACTICAL PRINTER. By C. W. Hearn. Second Edition. (Philadelphia: E. L. Wilson.)

The first edition of this work found ready acceptance in this country, as well as in the United States, and the new edition just issued has various additions and improvements, as well as the old matter. We hope for it the full appreciation it deserves, and which was accorded to the first edition.

THE ECONOMICAL PRINTING-FRAME.

Messrs. Maull and Fox have favoured us with a further inspection of the printing-frame, invented by Mr. J. T. Lane, which was shown at the Photographic Exhibiton and the South London Technical Meeting. We cannot do better then give the description intended for that meeting:—

By the aid of the "Economical" chromotype and combination printing frame, it will be seen that chromotype and combination printers have a still farther choice of means at their command for the production of their specialities, and one that will be found to combine within itself special features which are likely to be fully appreciated by those who use it.

In the first place, it may be noticed that there is not the trouble of having to use *two* frames for the production of *one* picture; and in the next, every frame carries its own actinometer, thus rendering it perfectly independent and complete in itself; and the actinometer is so placed in each frame that the eye may pass along a row, and detect the condition of each at a glance.

There is also a clever arrangement for vignetting, which will enable the photographer not only to vignette with ease and certainty, but also to print a tint on the paper, thus doing away with the stray contrast which is often so painful to see.

Masks and discs are provided with each frame, and they are so made that they can be used alternately, being secured in position by means of a spring. The masks and discs are united to each other at the end or side, as the case may require, forming, as it were, a couple of leaves; the discs are mounted upon transparent medium which receives letter-press—thus printing an address, &c., whilst the tint is being printed.

The frame and its appliances are used in the following manner:—After placing a negative in it, adjust one of the masks over the negative, and secure the end of the mask by the spring. Turn the disc backwards, laying it down out of the way; then place the prepared tissue or sensitive paper, registering it by the corner of the frame most convenient (the frame has a raised ledge for this purpose), and print, adjusting the actinometer as desired (it is an advantage to mark tissue on the back, so as to be able to recognise the registered end). When printed, take out the negative (do not alter the spring holding the mask in position), replace the negative with a plate of clear glass, turn the mask underneath and backward, bring the disc over and forward, replace the tissue or silvered paper, and complete the printing.

It will be seen that this mode of working places in the hands of a printer the means of securing by masks and discs of various shapes numerous combination effects, as backgrounds, clouds, &c., may be added or suppressed at will.

In using this frame for chromotype work, a considerable saving of time can be effected by cutting the tissue twice as long and twice as broad as the negative to be printed, and folding it once; or if there be two negatives on a plate, eight copies can be printed on a single sheet, and, of course, all developed or transferred by a single operation.

The print shown will print one 8½ by 6½, or two cabinets, or four cartes-de-visite in silver, and one 8½ by 6½ Autotype print; or one cabinet, or two carte-de-visites in chromotype work. The chromotype and combination printing being for the smaller sizes, a frame is being prepared by which larger sizes in combination printing will be executed. Of course, the vignetting is available for either carbon or silver printing.

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TRANSFERRED ENGRAVINGS.

If dirty, the print may be cleaned by means of bread crumb; then, to soften the ink, the print is put to soak in a 3 per cent. solution of strontic oxide, kept at a temperature of about 83° C.; the necessary time for soaking can be found by experimenting on a piece of margin or extraneous matter, cutting off a small piece, drying it, then damping with nitric acid as hereafter described, and then observing whether it gives a set-off on being rubbed against another piece of paper with the thumb-nail. The length of time may vary from ten minutes to an hour and a half. When the print is removed from the solution it is thoroughly and carefully washed with hot water, superfluous moisture being absorbed by blotting-paper; it is then laid face downward on a few layers of blotting-paper, and the back well brushed with a 20 per cent. solution of nitric acid until the paper is evenly and thoroughly soaked; it is then dried between successive sheets of blotting-paper. The zinc plate is prepared much the same way as for zincography, with the exception of graining; instead of this it is rubbed with Water of Ayr stone, and finally polished with pumice powder. In transferring, much stronger pressure is required than for zincography; indeed, theoretically, a copper-plate printing press should be used, but in practice a good litho press will be found to answer almost as well. After having adjusted the pressure, place the print face downward on the plate, and immediately pull it firmly and evenly through the press. An intervention of thirty seconds after the print is put on the plate would be fatal to success.

After the print is peeled off, the plate is sponged over with unsoured gum water; water is then sprinkled on, and it is gently washed with a clean rag to remove any adherent particles of paper; the transfer on the plate is then rubbed over with a mixture of lithographic ink, thin varnish, and gum water, by means of a fine sponge, care being taken to have an excess of gum water to prevent "blacking up." When sufficient ink has adhered to the lines, the plate is flushed with water under the tap, and is then slightly etched with phosphoric acid and gum water solution, diluted with its bulk of water; the plate is next rolled up with printing ink and re-etched with the normal solution. It is now ready for use, and can either be printed from in a litho press, or it can be etched by acid, and then printed typographically.

In preparing freshly printed matter, the print is at once saturated with the nitric acid solution, all further manipulation being the same, with the exception, perhaps, of rather less pressure in transferring.—*Scientific American.*

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CROSS-EYED EFFECTS, AND THE REMEDY.

BY H. J. RODGERS.*

"Shall have to try it over again. The expression is not good. Look a little pleasanter next time, and do not stare quite so much." Sometimes the results of our own faults and habits reverberate back to us, although many times we conscientiously disclaim the fault as emanating from ourselves. What pleasure and benefit would accrue in carefully arranging a basket, or dish of flowers, and then, the next moment, in a childlike manner, upsetting it? What is the use in spending our time and artistic energies in trying to make a Raffaelle of ourselves in transferring our ideal conceptions into the loveliest creations; of calling up the "individuality of the soul;" in bringing our sitters to such a mood that the beauty of emotion will fill the sparkling and joyous eye, and working for that expression that beautifies and flings sunshine and happiness over the countenance, and then most absurdly knocking the "whole business" over? Then, we have an easy alternative in charging our sitters with assuming a bad expression, for which we ourselves are at fault. And sometimes it would seem as if many expressions obtained were pretty well filled with vacuity and imbecility; transformed into the meaningless, void gaze of the Egyptian mummy. The eyes, it is well known, are the most expressive features in the human face, and when distorted in sitting for a picture, too close to the camera, with a short range of vision, cause the rest of the features to become unnatural, and more or less distorted. Distance lends precisely the same effect, as far as softness and delicacy are concerned, to the camera, as to our visual organs; and, moreover, the best effects of good lighting are preserved by distance; and, in a measure, lost through necessity of too cramped a space, both with the camera and the objective point of vision. Equal benefits in securing a good expression are gained by distance. How often the expression, which otherwise would be good, is lost through this habit of the sitter being requested to look at a mark, and the detrimental feature of it is the lacking of space between the eyes and the mark! This many times is unavoidably owing to want of space in operating rooms. One of the most essential requisites is to have distance enough to make all card work with a 4 by 4 or even larger lens. Probably all photographers have noticed the depth and softness of light and shade, and the rotundity of the features of a small head in standing figure, and the entire absence of the cross-eyed effect contrasted with a large head. If distance is not one of the conveniences of the studio, cause the sitter to look the greatest distance the room affords, no matter how near the camera may by necessity be placed. It will be noticeably observed that, if we sit down and look at an object—especially if it be a small one—the shortest possible distance our eyes converge, in proportion to the rays concentrated in that distance, showing nearly all the eye-balls on the outer edges, producing an extreme cross-eyed effect, and by placing the object further off by degrees, we can feel our eyes move outward, giving a more expressive and natural feeling and ease to the eyes. The eyes being contracted or converged toward each other, a scowl will necessarily be produced, causing vertical and horizontal wrinkles between the eyes and across the forehead, literally effacing the sought-for expression. On the other hand, by looking at a distance, the wrinkles, &c., are either modified or removed, and the eyes expand to their natural fulness, and the expression of the face, from whatever emotion, is preserved. To ensure a good expression, and avoid the common cross-eyed effect, an effectual remedy is made by causing the sitter to look through an aperture. That is: take a cardboard 8 by 10 size or larger, paint it black, and cut through it an oval 5 by 7, and fix this to a standard so that it can be made to move up and down. It can be placed close to the sitter if necessary, and the sitter is requested to look through it to the farthest point in the room. The contrivance being so simple and effectual, it will well pay any one, if only for the idea of securing a good expression, to say nothing of doing away with cross-eyed effects.

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* *Practical Photographer.*

PS.—Another advantage gained in using a large camera and having plenty of distance is the saving of retouching. If this is not practical, why is there not as much retouching necessary on a small head (in proportion to its size) as on a large one? Will some one explain?

Correspondence.

LOST SPECIMENS AT THE EXHIBITION.

Dear Sir,—As the eight pictures I contributed to the recent Exhibition have mysteriously disappeared, and under peculiar circumstances, I shall be glad if you will allow me to state the facts of the case in the News, in the hope that some clue may be found of their whereabouts.

As no packing cases were allowed at the Gallery, I sent my pictures to a friend in London, who unpacked and delivered them at the Gallery. My friend (Miss R.) was told nothing as to fetching them away by the people at Pall Mall; but, at the close of the Exhibition (of which I received no notice) I wrote to her, asking her to call for the pictures and send them back to me. She thought they would not deliver them without a written order from me, and the posting of this order caused two days' delay. It thus happened it was not until the following Thursday, after the close of the Exhibition, that the pictures were asked for. On application at the Gallery my friend was told all the unclaimed prints had been sent to Mr. Bourlet, of Nassau Street. On going to him, nothing could be heard of the pictures, and after waiting until now for enquiries to be made, I have just received letter from Miss R., in which she says: "I am so vexed about your pictures, but do not know what to do. They say at Pall Mall, every picture was sent away the day after the Exhibition closed, and Mr. Bourlet, in Nassau Street, says he has never seen them." I understood the Exhibition closed on a Saturday, so by the *next day* I suppose they meant Monday. I make no comments on the dreadful want of management shown by some one; but as I cannot help thinking the pictures have been stolen, I should like to know who is responsible. Occurrences of this kind are not inducements to exhibit.—Yours truly, **Henry Cooper.**

[We are glad to be able to add, that since this letter was in type we have made enquiries, and have ascertained that this frame is at the Exhibition hall, in the charge of the hall-keeper, having been put aside *too* carefully.—Ed.]

THE LUXOGRAPH TESTIMONIALS.

Sir,—Among the advertisements of your journal last week I observed one in which the proprietors of the "Luxograph" publish a testimonial, written by Signor Lombardi, wherein he ingeniously makes me endorse his enthusiastic opinion of the light. I beg to inform your readers that my name was introduced without my approval or knowledge, and I do not share his opinion of the "Luxograph" in its present form.—I am, your obedient servant,

Robert Faulkner.

THE RECENT MEDALS AWARDS.

Sir,—I know nothing of the details of Mr. Jennings' business management. I sent my friend's order to an agency firm to execute, and heard no more till informed of the unsatisfactory result. As some one in India also wanted prints, apparently two people have been victimized.—Yours, &c.,

Stuart Wortley.

Proceedings of Societies.

Photographic Society of Great Britain.

The usual monthly meeting was held in the Water Colour Gallery on the evening of Tuesday, the 10th instant, Mr. J Glaisher, F.R.S., in the chair.

The minutes of a former meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Captain Reeves, Messrs. Guttenberg, Hoare, Marsh, Brown, Broderick, Greaves, Harrison, and Pettitt.

The Chairman announced that the Council had resolved on the distribution of a permanent presentation print to members.

Mr. Cooper then read a paper on a reliable dry plate process, giving details of the emulsion process by which his charming pictures in the Exhibition were produced. Some very fine negatives were passed round as illustrating the character of the work produced.

A paper by Mr. Warnerke was read by the Secretary on a case of the destruction of the image on an emulsion plate, and its restoration. Some exposed plates, which, on the application of the ordinary alkaline developing agents, refused to yield an image, when previously immersed in a solution of carbonate of ammonia yielded good results.

Captain Abney, referring to a remark in Mr. Cooper's paper on spots in emulsion plates, said that at the next meeting he hoped to be able to enter into the subject. He would also commend to Mr. Cooper's attention the method which he (Captain Abney) had recently described of evaporating the solvents of the emulsion by heat. Referring to the deposit described by Mr. Cooper when adding lactate of ammonia, he thought it was lactate of zinc, which, being insoluble, fell down. If, instead of using lactate of ammonia, he used lactic acid, he would form lactate of silver, and liberate nitric acid. He agreed as to the value of albumen as a preservative, but liked the addition of beer, as the mixture gave such delicate results. He preferred the use of sulphite of soda to gallic acid.

Mr. Sebastian Davis had experimented with emulsion during last summer. He did not wash it, but guaged the proportions, using a chromated paper as a test for the presence of free silver. He had used it with a preservative he had before described as used with bath plates.

After some conversation on the mottling of emulsion films, and a vote of thanks, the subject dropped.

Mr. W. **Willis**, Jun., then read a paper describing his new platinum printing process, and gave a practical demonstration, which was very satisfactory, giving excellent prints.

After some conversation on the subject, and a vote of thanks,

Mr. E. **Cocking** read a paper on the "Objective and Subjective in Pictorial Art."

After which the proceedings terminated.

South London Photographic Society.

The annual meeting of this Society was held in the Hall of the Society of Arts on the evening of Thursday, December 5th, Mr. P. **Mawdsley** in the chair.

The minutes of a previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. E. Benthin, J. Anckorn, and Laurie.

The **Secretary** then read the report for the past year as follows:—

Annual Report.

Your Committee, in presenting the Annual Report of the South London Photographic Society for the session 1878, have reason to think that the amount of work done has been more than could have been expected, after taking into consideration the disturbing influences in political and commercial circles which have characterized the past year, and which, to some extent, must interfere with the careful consideration of scientific subjects; more especially to those who, whilst engaged in the daily routine of work, come forward voluntarily to supply subject matter for discussion at your monthly meetings; and whilst all praise should be awarded to those few members who, by writing papers, have endeavoured to maintain the prestige of the Society, your Committee cannot but express a desire that others, and especially the new members, who have hitherto not done anything in the same direction, should seriously try to commit to writing any thoughts that may arise whilst engaged in the practice of their art-science.

It frequently happens that in simple statements of any variation in what appear to be ordinary facts, there lies concealed something which discussion often brings to the surface and throws a light upon, resulting in useful information; and your Society offering facilities, by its conversational mode of investigating detail, it is hoped that the future will show that such opportunities have been taken advantage of.

Your Committee, in referring to the annual recurrence of the Technical Meeting, would wish to call attention to the fact that all your Society can do is to afford an opportunity (perfectly free) for new inventions and appliances to be published and explained; but the value of each technical meeting must depend upon the inventive power which has been at work since the last meeting. Whether it be much or little, at the same time your Society deserves credit for giving inventors so desirable a privilege.

The opening meeting of the session was again devoted to a lantern exhibition, when readings were introduced for the first time, one from the Pickwick Papers, "Gabriel Grub," being given by S. Statham, and a very dramatic reading of "Jane Conquest," by Miss Alice Burnelle.

The following papers have been read during the session, viz., "Educational Uses of Photography," by Edwin Cocking; "On the Elimination of Soluble Salts from Gelatine Emulsions," by F. Wratten; "The Use of Alcohol in Gelatino-Bromide Emulsions," by E. Foxlee; "On the Reproduction and Enlargement of Negatives by the Collodio-Emulsion Process," by W. Brooks; "Varieties," by Edward Dunmore; "Photographic Experiences in Paris," by F. York; "A Curious Incident in connection with Paper Enlargements," by F. A. Bridge; "Special Cotton for Making Pyroxyline," by Leon Warnerke; "On the Rectification of Silver Baths," by W. T. Wilkinson.

Photographs, apparatus, and appliances have been exhibited by the following gentlemen:—Messrs. W. M. Ayres, T. Avery, W. Adkins, C. Bennett, F. A. Bridge, W. Brooks, T. Bolas, W. Cobb, F. Cowan, A. Clarke, G. Dunmore, T. Harrison, T. G. Hemery, Baynham Jones, J. T. Lane, R. Kennett, Lieut. Lysaght, P. Mawdsley, J. Nesbitt, J. Penny, C. Smith, L. Warnerke, J. Werge, F. Wratten, W. Woodbury, and F. York.

In conclusion, your Committee hopes that the forthcoming session will be valuable from the subjects brought forward for consideration, and that the younger members of the profession will recognise the importance of giving material support to a society which affords so pleasant a medium for the discussion and elucidation of all art and scientific matters connected with photography.

The report having been read and adopted,

The **Treasurer** read his report, which, he regretted to say, presented a deficit from the tardiness with which many members paid their subscriptions.

After a discussion on the best mode of remedying the evil in question, it was resolved to leave the balance sheet open until March, when, if recalcitrant members paid up, the year's account could be closed satisfactorily.

The officers for the ensuing year were elected as follows:—

President.—The Rev. F. F. Statham, M.A., F.S.A.

Vice-presidents.—G. Wharton Simpson, M.A., F.S.A., Jabez Hughes, Frank Howard, William Brooks, P. Mawdsley, and E. Cocking.

Committee.—Messrs. Ayres, Bolas, E. Dunmore, Nesbitt, Warnerke, York, Cutchley, and Adkins.

Treasurer.—F. Bridge.

Secretary.—H. Garrett Cocking.

After votes of thanks to the President and Secretary, and a response from the latter,

The **Secretary** read a paper by Mr. Wilkinson, "On Restoring a Disordered Bath" (see page 591).

The proceedings terminated with the announcement that the next meeting, to be held in January, would be a popular meeting, with a lantern entertainment by Mr. York.

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting of this Society was held as usual at the Museum, Queen's Road, on Wednesday, December 4th; Mr. E. **Brightman** in the chair.

The minutes having been passed, Messrs. R. Biggs and G. F. Powell, of Bath, were, on the motion of Mr. H. A. H. Daniel, seconded by the Chairman, elected as ordinary members.

The Hon. **Secretary** then handed round some samples and copies of price list of the "Empire Opaque Cloth" for backgrounds, and made by Messrs. Avery and Co., of London. It was much admired, the texture being beautifully fine, and the colour chosen with great judgment.

Mr. E. **Brightman** remarked that as it was made coloured both sides, it would be a good plan if the manufacturers would place a different colour on each side, such as a medium dark one for three-quarter length figures, and a light one for vignettes. He thought it capital material, as it could be washed.

Mr. **Stevens** remarked as to the inexpensiveness of it.

Mr. H. A. H. **Daniel** introduced the subject of drying carbon tissue. He said that some few weeks back he prepared some 10 by 8 pieces, and hung them up in his laboratory to dry during the night, leaving his petrolene stove slightly burning, to keep the air as dry as possible; the stove emitted no smell. After printing the next morning, it was found utterly impossible to develop them the ensuing evening. Fearing that the bichromate solution may have been acid, he prepared some more sheets, sensitizing with the Autotype Company's own powder, dried in the same manner, and yet the same result. Seeing the Editor of the *British Journal* had recommended drying by a petrolene stove, he wrote and stated his experience. In a recent number this was printed, the Editor saying he had used a petrolene lamp without the evil effects spoken of, and that he should like to hear of the matter being discussed. Mr. Daniel therefore brought it before the meeting.

Mr. **Brightman** suggested that possibly some acid fumes may have existed in the operating room at the time, and, if so, he quite believed that it would be a sufficient reason for the occurrences.

Mr. **Stephens** presumed that the Autotype Company used a different means of drying, to which

Mr. **Brightman** replied, that he believed revolving fans, and other specially constructed apparatus, were used. He once was anxious to dry some sheets of carbon tissue by the next morning, and hung them near the ceiling of a room where gas had been burning all the evening, and shut the door; it was quite impossible to develop the pictures, the acid fumes of the gas rendering them quite insoluble. He now adopted the plan of using the kitchen grate, placing tissue on bamboo rods across it, letting the fire out, and using the heat from the iron plate at the top. In an hour or two it was quite dry.

Mr. **Davey** thought one of the "cheerful" gas stoves would be a good thing to use for drying, the fumes being carried off by a small pipe at the back, the hot iron of the stove being really the means.

Mr. H. A. H. **Daniel** had some hot water pipes passing through some rooms in his house, and he was making a drying cupboard to fit round them, with light-tight draught-holes at top and bottom; this arrangement, he hoped, would be practically perfect.

Mr. **Davey** enquired whether those present had been satisfied with the past summer's experience in the working of the triangular-shaped black tent, which the operator entirely entered, and which some of them, like himself, had adopted. The replies were in the affirmative, and

Mr. **Daniel** said that as far as he could see, he should not work in a box-tent again; he considered, however, that the following improvements might be made: viz., that instead of the present plan, short metal pins with cross swivel tops might be pushed into the ground through eyelet holes in the material at the base; and that instead of the water bags which many used as tanks, a zinc tank with a cover should be used, as that could be filled from a stream at once, and filling water bags from a stream was not only a difficulty, but also a very time-wasting operation. The zinc tank would not occupy extra space in packing, as it could be made exactly the size to hold a plate-box.

Mr. **Davey** made some other suggestions as to head room, and fixing the base in the tent in question.

Preparations were then made for carrying out one of the attractions of the evening, viz., "The Exhibition of Woodbury Lantern Slides" The lantern used was Newton's "Phantasmagoria Lantern," and their new three-wick Refulgent Lamp. Before commencing, Mr. Daniel said that he had had a communication from Messrs. Newton and Co., stating the result of their experiments since last season, which was, that they had constructed a three-wick lamp of great power and brilliancy. This lamp he had sent for, and they would use it for exhibiting the Woodbury Slides. He had with Mr. Kitt, the Bristol Gas Company's Engineer, tested the old two-wick and the new three-wick lamps most carefully, and found that the light of the former to the latter was as 45 to 64½, which was a very great increase of illuminating power. The light was then turned, and was much admired for its power and evenness.

Mr. **Brightman** then exhibited a large number of slides of foreign scenery and characters, and which fully maintained the reputation they have so deservedly gained. A few carbon tissue slides were also exhibited, and certainly proved the suitability of this process of making transparencies for the lantern.

Mr. **Daniel** said that the Autotype Company would be conferring a great boon on London exhibitors if they would not only supply a filtered black, but also a filtered purple tissue for transparencies, as that colour was so far more harmonious and pleasing on the screen, the Woodbury slides always looking so agreeable in colour.

All the slides having been shown, votes of thanks to Messrs. Brightman and Daniel were accorded, and the meeting was adjourned.

Edinburgh Photographic Society.

The second ordinary meeting of this Society was held in 5, St. Andrew Square, on the evening of Wednesday, 4th December, **John Lessels**, Esq., President, in the chair.

The minutes of the previous meeting having been approved, the following gentlemen were unanimously elected ordinary members:—Mr. G. W. Danter, Mr. John Hay, Mr. Wm. Steaurt, Mr. John Reid, and Mr. James Dall.

The **President** proposed that a presentation print be provided for the current year, and suggested that the subject should be chosen from nature.

The **Treasurer** (Mr. Alex. Mathison) having intimated that the funds would support the necessary expenditure, the matter was remitted to a small committee will full powers.

Mr. W. H. **Davies** next intimated the death of Mr. Carrick, an honorary member of the Society, and after a few appropriate remarks, moved that expressions of sympathy be sent to his widow, through the Corresponding Secretary of the Society.

This was agreed to.

Mr. W. **Neilson** then read a paper entitled "Art in Landscapes."*

This paper had been prepared for a forthcoming Annual, and not for reading to the Society, but after some pressure, Mr. Neilson had consented to read it on condition that a full report was not published. The paper was in the form of a dialogue intended to show (*a*) "Art is not an Imitation," and (*b*) "Pictorial grandeur depends wholly on shade."

Dr. **Hunter** said he had felt great pleasure in listening to such a poetically expressed and practical paper. He considered that artists as well as photographers did not pay sufficient attention to the shade of the pictures. He also would particularly urge upon photographers the desirability of looking pre-eminently to the general forms of their subjects, leaving the details to take care of themselves; by this means, he judged, pictures of high practical value would be obtained.

Mr. **Denovan Adams** remarked that artists endeavoured to put into their pictures not so much what they saw, as what they felt to be there; they thus succeeded more or less in representing the emotions. He (Mr. Adams) considered the photographer to be so hampered by mechanical details that he could never attain to the production of pictures possessing high art qualities, and so would have to be content to rest within the more modest sphere of the possible.

Mr. J. **Craig Christie** believed the difference between an artist and a photographer to be, that an artist is able to give the sum total of his experience of nature, both past and present; while the photographer is bound to represent a phase of nature only existing during a very limited period of time.

The **Secretary** (Mr. M. G. Dobbie) moved a vote of thanks to Mr. W. Neilson for the very kind way in which he undertook to bring this paper before the Society, and which had led to such an interesting discussion. This was carried by acclamation.

Mr. **Moncrieff** (Secretary of the Society of Arts) exhibited a fine photographic copy of an old painting illustrating the peculiarities of the German school as modified by Italian influence.

Mr. R. **Murray**, C.E., exhibited a large series of photographic views taken by the coffee process during the past season. They possessed considerable merit, the softness of the pictures being particularly noted, as also, in several instances, the happy selection of the point of view.

Mr. W. **Neilson**, in concluding a few remarks on the series, said that he had often enjoyed coffee, but never more than he had that night while looking over these pictures.

Mr. J. M. **Turnbull** next brought before the meeting Mr. Chadwick's oxygen generator, perfacing his illustrations with a short account of it as gleaned from the published proceedings of the Manchester Photographic Society. The apparatus was an object of very marked interest, everyone present seeming anxious to see it in all its details; its extreme simplicity and freedom from danger being highly appreciated. Considerable surprise was also manifested by its decided economy over the old method, the evolution of gas being almost exactly equal to what it ought to be theoretically. The small cake of composition employed produced a cubic foot of oxygen in about seven minutes after the Bunsen was lit, and that without any attention, trouble, dust, dirt, or annoyance of any kind whatever. A set of transparencies by Mr. York, illustrating the late Paris Exhibition, were thrown on the screen by the aid of the apparatus. It was suggested that a useful addition would be some simple means of working the generator when ordinary house gas was not available.

Votes of thanks to Messrs. Moncrieff, Murray, Turnbull, and to the President, concluded the meeting.

W. T. **Bashford**, Cor. Sec.

Photographic Society of Berlin.

At the general meeting of the 17th of October, under the presidency of Herr C. **Brasch**, the principal subject of discussion was the proposed revision of the statutes.

Afterwards, Herr **Seeligmann**, an amateur, exhibited some proofs taken from dry gelatine plates, and entered into an interesting discourse on the process.

Herr **Ernst Duby** expressed his regret that in consequence of the length to which the previous discussion had extended, there was scarcely time for a proper consideration of the subject, and Herr Seeligmann promised to recur to it again on a future occasion.

The ordinary meeting of the Society was held on the 7th of November, when Herr C. **Brasch** took the chair.

After the nomination of new members, Herr E. **Duby** introduced the subject of the new so-called *Rapid Process*, and submitted to the notice of the meeting a number of photographs sent by Herr F. Tromann, of Lugano. These proofs, indeed, were not produced by any special *extra-rapid* process: they serve rather to show that very short exposure can be attained by the ordinary method. This was acknowledged by the majority of the members present, though several expressed an opinion that some of the pictures, notwithstanding their excellent appearance, might with effect have received a few seconds' longer exposure.

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* This paper will appear in our forthcoming **Year-Book**, for which it was originally written.

Herr E. Duby also laid before the meeting a couple of pictures taken by Herr C. Gunther with Lehmann's patent diaphragm. These created great amusement, for while the centre of them is sharply defined, the fore and background are doubly distorted.

Herr Karl Schwier, of Weimar, President of the Photographic Society of Germany, sent an invitation to the Society of Berlin to take part in the reunion of German photographers which the executive of the former Society had arranged should be held next year in Dresden. The invitation was, however, declined, for the reason that the organization of such a reunion ought to be undertaken by all the professional societies in the country, not by one in particular.

Herr C. Fricke offered to the Society his new instantaneous process for the sum of 300 marks, and also submitted some negatives obtained by it. The opinion of the meeting, after a lively discussion, seemed to be that the examples before them were rather under-exposed, and no wish was expressed to acquire the process, for the present, at all events.

Dr. Stolze addressed the meeting on the subject of dry plates, and promised on a future occasion to give a lecture with illustrations on his photographic experiences in Persia.

The meeting was concluded with a communication from Herr Th. Joop, who exhibited the photographic negative of a copy of a map of Europe. On account of the perfect opacity of the lights it attracted general admiration; and, on being requested, he explained his process of obtaining this great density. The collodion he employs is iodized with potassium iodide alone—no bromine salts at all being used. After fixing, the collodion film is acidulated by pouring on it a solution of citric acid, and is then intensified with pyrogallic acid and silver.

Berlin Association for the Promotion of Photography

Meeting of the 18th October, Professor Vogel in the chair.

The Chairman laid before the meeting a copy of No. 42 of the Patent Journal, containing a report of the proceedings of the International Patent Congress at Paris, where the protection of patent rights in photographs was discussed. Among other views on the subject of photography that were expressed at this Congress, the following is of special interest:—"Photographic works must be divided into those which bear a commercial, and those which bear an artistic character; the former must be protected by a special law, the latter by the general law on artistic copyright." There is an important difference between this opinion and that pronounced in the German Parliament, where all claims to an artistic character were denied to photography.

The Court Photographer, Herr Schlosser, of Breslau, sent a report on the photographic section of the exhibition of art-manufactures held in that city.

Herr Gaillard exhibited a number of his helio-chromographs; these are, in fact, prints in oil colours, for the production of which the collotype process has been used. Being asked as to the method of their production, Herr Gaillard explained that the plates for printing the drawing were obtained by photography, while the colours were impressed by the ordinary process of chromo-lithography. In reply to another question, he stated that the pictures produced by this method are cheaper than prints in oil colours.

Dr. Vogel related his experiences of the Klary-Boissonas Lightning process, the result being his belief that a few seconds are gained in the exposure, but that the negative loses as regards quality.

Herren Jacobi and Martini stated that the opinions of other photographers, who had at some cost learned the process, agreed completely with those of Dr. Vogel.

Herr Seeligmann exhibited a very useful and portable camera-stand of English manufacture; though possessing extraordinary stability, it can be folded up and carried like a stick. He also showed a well-arranged camera for dry plates, and a box for keeping and changing the plates. Besides these, the speaker drew attention to a camera invented by Warnerke for the use of his endless negative paper. Herr Seeligmann further described the results of his experiences with dry plates during his travels in Switzerland. He had tried both Warnerke's and Wilde's emulsions, and found that the former requires ten times, and the latter fifteen times as long an exposure as wet plates. This is, however, true only in the case where the plates are developed shortly after exposure; if any long time is allowed to elapse, the exposure necessary is four times as long as that above described. Much better results were obtained with Kennett's gelatino-emulsion plates. Of these there are two kinds, the first requiring to be exposed about twice, and the second a little more than half the time of wet plates. Plates prepared with this emulsion will keep for weeks after exposure without deteriorating. Kennett's emulsion is sent in a dry state in the form of pellicles, which when used are dissolved in hot water. The speaker exhibited a number of negatives that he had taken on dry gelatine plates; they showed great purity, but seemed to be somewhat thin. The speaker, however, assured the meeting that on account of their non-actinic colour they gave excellent copies. An instantaneous picture taken in dull weather was much noticed as showing the great sensitiveness of these plates. In reply to a question as to the percentage of really good plates that could be produced by the process, Herr Seeligmann stated that a large proportion of the collodion emulsion plates had been spoiled because he had not reckoned on their deteriorating by keeping; if it had not been for this circumstance he would certainly have obtained ninety per cent. of good ones. His gelatine plates had nearly all succeeded.

Professor Vogel, who in his excursions had worked with wet as well as dry plates, believed that he had as large a proportion of failures with one kind as with the other. Certain as the wet process is, there occur in travelling all kinds of accidents that may affect it: hot weather, dust, impure water, insects, imperfections in the tent, are circumstances of this kind, which in the dry process need not be taken into consideration. On one occasion he took a bottle of emulsion with him, and prepared his dry plates the evening before using, placing them in the box after allowing them to dry for half-an-hour. In the course of the next day (they were exposed and developed the same evening) out of a dozen plates, not one had failed owing to faults in the preparation; the failures that did occur were due partly to under-exposure, partly to the prevalence of a high wind which shook the camera.

A letter was read from Herr K. Schwier, President of the German Photographic Society, inviting the Berlin Association to take part in the reunion of the German photographers which, under the auspices of the former society, it was proposed to hold in Dresden, in August of the coming year. An opinion was, however, generally expressed that the Berlin photographers would have enough on their hands with their local exhibition of next year, and that therefore the time selected for the reunion was unfavourable. It was further remarked that it would have been better, before deciding on holding such a reunion, to have consulted the wishes of the various photographic societies in the country. The meeting therefore decided that the invitation should be declined on the part of the Association. Of course any member in his individual capacity could attend the reunion if he so desired.

Talk in the Studio.

Honours to Exhibitors.—We notice, amongst the exhibitors at the late Paris Exhibition who have been decorated by the French Government with the order of the Legion of Honour, Mr. J. H. Dallmeyer, who is made Chevalier of the Legion of Honour. This, so far as we have seen, is the only decoration of the kind awarded to photography. But as the decorations appear to be made in batches—they are certainly announced so—we may yet hope to see more.

Permanency of the Daguerreotype.—We have been favoured with a sight of a Daguerreotype taken by Stalzer, Hamburg, in 1847, or thirty-one years ago. The picture is in marvellous preservation, and a striking example of *enduring* photography. It represents the parents of the gentleman to whom we are indebted for this sight, a Queen's officer, then serving on the theatre of the present war, and remained uninjured after the owner's luggage had been immersed in 1848 four hours in the river Jhelim, through the drowning of the camel during the passage of the field force under General Gilbert in pursuit of the Afghan army. The picture, which has travelled with its possessor nearly all over the globe, may be seen at our office during the next few weeks by any one interested in early photography.

Photograph or Hot "Taters."—The following, says a correspondent, occurred last Sunday morning:—"A photographer, while setting up his dark tent (a black box about two feet square) last Sunday morning at Stamford Hill, was asked by a labourer, quite in earnest, "Have you got any hot-uns"? The photographer, taken quite by surprise, asked, "Any hot what?" "Taters!" says the man. The photographer, scarcely able to answer, gasped out, "Taters? No, portraits!"

Removal of Stains.—The *Apothek Zeitung* gives some useful hints in regard to stains. Easiest to remove are those of sugar, gelatine, blood, and albumen. A simple washing with water is all that is necessary for all kinds of fabrics. Grease spots:—For white linen or cotton goods, use soap or weak lye; for coloured calicoes, warm soapsuds; for woollens, soapsuds or ammonia; for silks, benzine, ether, ammonia, magnesia, chalk, yolk of egg, with water. Paints, varnishes, &c.:—Chloroform. Rust and ink:—White cottons and linens, warm solution of oxalic acid; coloured cottons and woollens, repeated washings with a solution of citric acid, if the colour is fast; silks, do nothing; all attempts only make things worse. Acids, vinegar, orange-juice, &c.:—White cottons and linens, wash with pure water, or warm chlorine water; coloured goods and silks, ammonia diluted according to the fineness of the tissue and the delicacy of the colour. Tar, axle-grease:—White cottons and linens, soap, oil of turpentine and water, each applied in turns; coloured cottons and woollens, first smear with lard, rub with soap and water, and let it stand for a short time, then wash with oil of turpentine and water alternately; silks, the same, using benzine instead of turpentine, and dropping the water from a certain height on the under side of the stain; avoid rubbing. Wine and fruit stains:—White cotton or linen, fumes of burning sulphur, warm chlorine water; coloured cottons and woollens, wash with tepid soapsuds or ammonia; silks, the same, with very gentle rubbing.

To Correspondents.

⁂ The Year-Book of Photography for 1879.—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

Brother Smut.—Equally good slides can be produced on coffee plates and on wet plates. Much depends on which method you are most familiar with. If you know the wet process well, and have facilities for the work, nothing is better for producing slides. They may be toned either with gold, or with bichloride of mercury followed by sulphide of ammonium. 2. They are better not varnished. 3. The opalescence in the shadows of which you speak is probably a trace of fog. Some samples of gun-cotton in the collodion always give a slightly opalescent film, however. The hint you give is useful.

W. Ord.—We have no certain knowledge of the movements of the gentleman in question, but we have heard that he is out of town, and has been for some weeks past.

P. Lemant.—The makers of the frame in question are Maull and Fox, 62, Cheapside. Mr. Lane may be addressed to their care.

Anxious Enquirer.—The case is very perplexing, and unusual in its character, inasmuch as the defects seem to be different to those commonly found in confessedly fading photographs. We may, however, say at the outset, that we see no reason to suppose that any imperfection in the colours could cause such a result. The slightest education of the eye or familiarity with water colours would satisfy the examiner that body colours were not used, the effect of which is perceptible at once. Besides, if body colours had been used, no such result could follow. The Chinese white used to give "body" is oxide of zinc, and would not be injurious. We should regard all the colours you mention as safe enough. Theoretically, we should not like vermilion, which is a salt of mercury; but we have often used it on photographs without any evil result. After carefully weighing all the circumstances, we are disposed to believe that two causes have been in operation. In the first place, the prints are, from some cause, fading, and traces of hypo probably left in them. This may happen without any serious results showing for a very long time—not showing at all, possibly, until some secondary cause comes into operation. Such a secondary cause would be found in gum if it had turned a little acid. It is probable that you may imitate the defects in question by the following plan: Take a print which is imperfectly washed, and hypo certainly left in it. Dry it, and then treat it with acid gum, or paint it with colour mixed with acid gum. You will, we think, get a similar result. But the condition of the print is the primary cause. The fact that the deeply printed guides have not faded proves nothing in relation to the others which have faded. They may have been kept in different conditions. And, moreover, as we have more than once pointed out, deep printing is conducive to permanency in silver prints, and light printing to fading. It is a sad confession, but an unavoidable one, that no silver prints can be guaranteed as permanent, and the causes of fading are numerous and subtle. We will answer your three questions categorically. 1. In regard to the colours producing such effects: We think not 2. Regarding the washing of the photograph: If a print be properly fixed, a trace of hypo left from imperfect washing would not necessarily produce fading; but if it came afterwards into contact with an acid, fading would probably follow. 3. Albumen is by many supposed to be a cause of fading; but we don't think it was so in this case. Finally, barely possible, and certainly improbable. We can quite understand the importance of tracing the matter to its cause, and would gladly aid in doing so. Broadly stated, it is undoubtedly the use of silver printing, which is at its best untrustworthy, and should never be made the basis of valuable painting.

C. W. (Aldershot).—The cabinets received are very good photographs, and, if skilfully enlarged and finished, might make effective contributions for exhibition. They are not, however, sufficiently perfect, from an art point of view, for issue as studies. Pictorially considered, they are what an educated artist would style "spotty," that is, they have many scattered lights, which destroy breadth and repose. The technical or photographic qualities are very good.

Aug. Bauernheimer.—We have no personal experience with the process in question; but we can only suppose failure to arise from some imperfection or difference in the materials, probably in the gum myrrh. The theory of the process appears to be that the gum added to the collodion forms a varnish, which, on being applied cold, "chills," and gives a white surface, as a spirit varnish would under similar conditions. We should try another gum resin, say sandarac or lac. We remember your name as a collaborateur of our deceased friend!

R. R.—We regret that we cannot give you any efficient advice. It is very provoking to entrust a person with work to do, to pay in advance, and then find the work worthless. But we fear it is a thing for which it is difficult to find a remedy. Blundering and unskilful workers, who believe their work is good, and advertise it as such, will always be found. The only plan to avoid being cheated seriously is to give a very small test order first of all. If we were to insert any caution which should have the effect of injuring the business of the blunderer, we, and you too, should be liable to action for libel, as the law protects a man from any public statement, true or false, which does him or his business injury. The best advice we can give you is to take care not to be cheated twice.

C. R.—Streaks will arise from various causes. A common one is scum on the surface of the solution. This should be removed, before immersing a plate, by drawing strips of clean blotting-paper over the surface. A remedy in other cases consists in moving the plate laterally whilst in the bath.

W. Morgan.—We have addressed and posted the letter.

Cintra.—Your projected studio promises very well. Do not make the skylight less than 12 feet long, we mean along the roof, but a couple of feet more if you can. The proportions in other respects will, we think, do well.

Several Correspondents in our next.

The Photographic News, December 20, 1878.

PHOTOGRAPHY IN AND OUT OF THE STUDIO.

Mr. Hodge at a Fashionable Studio—Mr. Henry Cooper's New Dry Process—The Presentation Print.

Mr. Hodge at a Fashionable Studio.—If Mr. Hodge and his missis, who are up for the Cattle Show, should happen to put in an appearance rather earlier than usual at the fashionable photographer's by whom their portraits are to be taken, the worthy couple must undoubtedly experience something of a shock to their nerves when they look at the accessories and apparatus pushed into a corner during the setting straight of the studio. Mr. Hodge determined long ago to have a good portrait done when next he was in town, and, as the Lunnun folks can do anything, he never considers for a moment that the dull days of early December are likely to interfere with the carrying out of his pet design. He doesn't mind a sovereign or two under the circumstances, and since he finds the funds, he expects that the photographer will find all else, sun included. He likes doing the thing "first-rate," at times, and so Mrs. Hodge, in a lurid red gown, and green shawl, accompanies him to Baker Street before the hazy sun has well got over the chimney-pots. Mr. and Mrs. Hodge have often seen the London photographs, but never knew how they were taken. As they gaze upon the instruments and accessories before them, their ideas upon the subject grow apace. They know, of course, during the past few years a good many improvements have taken place in dental surgery—that there is such a thing as nitrous oxide gas, for painless extraction—but here are more apparatus even than a dentist would require. There is the same sort of comfortable chair, which has known all kinds of sufferers; but it has more fastenings and tourniquets than a surgeon would require to pin a patient. Nor is all the apparatus, as Mr. Hodge points out, for external treatment. There is a long flexible tube, evidently belonging to a stomach pump, at the end of which is a bulb for exhausting the air, the same being marked, like the medicine you buy with a three-halfpenny stamp affixed, "Cadett's Patent," or it may be, more appalling still, Cowan's electric shutter. Beyond this is an uncanny-looking seat, made evidently so that the operator may approach you from every side, for when you sit down, it is invisible. Poor Hodge points out how helpless you are when once you have taken your seat thereon. There are clasping tongs, the prongs made not of metal, but of horn, so that the patient may not feel their touch until he is firmly gripped. Hodge gets out a huge blue and red handkerchief to wipe the perspiration from his brow as he views these aids of the photographer. He begins to understand how the pearl-white complexions are secured, and glances uneasily at the missis before he raises the question as to whether all the suffering they will have to undergo is worth the glazing and finish upon the little portraits that they are to carry back with them. Perhaps if they were permitted to remain by themselves another ten minutes, face to face with the complicated apparatus, Mr. and Mrs. Hodge would leave their money and hasten back to Stoke-cum-Pogis; but, fortunately, they are asked into the sumptuously fitted dressing rooms to make ready. There are grand mirrors and fine toilet services, but Mr. Hodge refuses to become a lamb for the sacrifice. He sits down doggedly with his hands in his pockets, and does nothing but repeat rude words. If they mean to play any of their tricks upon him they will find he is ready for them. When it comes to the posing, he looks round sharply now and then to see what the young man is doing with those screws behind his back. He is in a state of ready defence. He permits himself to be set straight here and there; so far, he has made no protest, but they had best beware. He is instructed where to look, but for all that he keeps half an eye upon the advancing gentleman with the tube in his hand, lest, as Hodge afterwards explained, "the fellow might want to shove the blow'd thing down my throat." But, to his obvious relief, the business is over without any violence being attempted, and then Mrs. Hodge is permitted to go through the ordeal. It is not clear in their minds, as they issue into the street with singular light-heartedness, and repair to the "Criterion" for lunch, how the implements exercise an influence upon the finished portraits, but they quite agree upon the subject that until the local photographer at Stoke-cum-Pogis has invisible chairs, rods, tongs, and flexible tubes at his disposal, he can never succeed in taking a good portrait.

Mr. Henry Cooper's New Dry Process.—We think Mr. Henry Cooper is in the right when he says that extra rapidity is not the great desideratum of new dry plate processes. What we want first of all are *pictures*, then the means of getting them may be as facile as you choose. In Capt. Paget's prize, which is to be awarded next spring, we sincerely trust the judges will bear this point especially in mind. A process which will give a series of pictures from a series of plates is far better than an exquisitely sensitive film to the general worker, however much rapid methods may be useful for special purposes. Indeed, like a very sharp tool, a very rapid process has its disadvantages. All sorts of improvised arrangements are necessary in the dark-room, to prevent light acting upon the film; and yet, in ordinary work, it is really seldom that this extra-sensitiveness is wanted. Of all things, a picture-making dry-process is the thing required, as Mr. Henry Cooper says, and as Captain Paget desires to see—a dry process which will give half tones as rich and vigorous as a wet plate, which will show delicate contrasts and fine shadows. It may be no novelty to secure these advantages, but hitherto they have been obtained only by masters in the art, by those who themselves have worked out the process they practise. In the hands of others, these special dry processes have hitherto failed, and it will be welcome news, indeed, if we find "a really reliable dry-plate process" fulfils the promise it gives.

The Presentation Print.—We are glad to see that the Photographic Society of Great Britain is again about to issue a presentation print. It is a good custom and an old one, and there is no reason why it should be discontinued. Indeed, from the circumstance that the exhibition is now in such a flourishing state, and there are so many prints to choose from, the custom is one that might be put in force with great advantage. The print chosen should obviously be one of the medal pictures, and if possible should be that declared the best in the room, supposing a medal is given for such a picture. Few exhibitors would decline either to lend the Society the negative, or supply the necessary impressions at a reasonable rate, and any money spent in this direction would certainly meet with the approbation of the members. To print the picture by a permanent process should not be an insuperable difficulty in these days, although it may be more difficult than some are willing to admit. Country members have, we know, experienced some difficulty hitherto in receiving their copies, but in this case, we believe, the pictures will be issued on a roller, so that the post may transmit them to all impartially. The cost of doing this is comparatively small, and every member has thus a memento of the exhibition. We trust that now the custom has been revived it will not again be permitted to fall in abeyance, but that year after year a print from every annual exhibition will be forwarded to every individual member who has supported the Society with funds for carrying on its work.

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A REALLY RELIABLE DRY-PLATE PROCESS.

BY HENRY COOPER, JUN.

Although from time to time an immense number of formulæ for collodio-bromide processes have been published, I am induced to add one more to the list; and, I believe, not without some satisfactory reasons. I have entitled this paper "A Really Reliable Dry-plate Process," as I feel convinced, from a multitude of trials under the most varied circumstances, that plates prepared in the manner I am about to describe fulfil all the requirements of the artistic photographer, whether amateur or professional, and, so far as I can judge, there is only one respect in which they might be improved. A little extra rapidity would add to their value; but even this I hope soon to gain. It must be borne in mind it is of the plates themselves, when ready for the camera, I speak as being all but perfect. In the method of their preparation very many improvements may in time be made.

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* Read before the Photographic Society of Great Britain.

It will doubtless be within the knowledge of many of my hearers that for many years past I have devoted a great deal of time and labour to experiments on various emulsion processes; that I have, from time to time, at longish intervals, published formulæ for the help of others working in the same direction as myself; and also that I have often shown at the Society's exhibitions pictures produced by the methods I at the time advocated.

We began with a very simple process, and then, as we went on from step to step, all varieties of complications were introduced with much pride, by different individuals. Then came a reaction: we almost returned to our pristine simplicity; and at last the washed emulsion process was invented, and ultimately became a practical commercial success. When this stage was reached, we most of us imagined the experimentalists might take a well-earned rest, as we had obtained what had so long been desired, a simple and sure process. But soon these delightful dreams were rudely disturbed, and we awoke to the knowledge of difficulties of a new kind, and after much disheartening work I began to think we had, after all, been working in a wrong direction, and I even hinted in print at my melancholy convictions. Spite of the exquisite simplicity of the method, and the very fair quality of negative given by many of the washed emulsion processes, I was compelled to confess that I, at least, could not prepare plates by the process, which, after keeping for some time, would give even decent negatives; and hundreds have echoed the same doleful tale.

To those who have taken any interest in the subject, the discussion on the peculiar spots and markings which almost always were the defects on these plates, must be too familiar for any need of much reference to it now. Suffice it to say my own convictions, based on a multitude of experiments, were at the time quite in accordance with those of most other workers as to the cause of our trouble, and in a short article in both this years' Almanacs, I recorded my opinion that our enemy was simply organic dust, and at the same time held out hopes of a cure. Doubts have recently been thrown on the correctness of our supposition as to the cause of the spots, and I am anxiously awaiting Captain Abney's promised disclosures on the subject.

However, be the cause what it may, we are all agreed the use of a "preservative" in the preparation of the plate will entirely prevent the appearance of the pests, and I am much pleased to be able to give formulæ by which films possessing the following most desirable qualities may be produced with certainty and rapidity. First, the quality of image is almost perfect; much resembling that given by a really good collodio-albumen plate. Secondly, the films will keep for a lengthy period without deterioration, both before and after exposure. I shall exhibit a negative which was kept five months before exposure, remaining for three months in a dark slide, and carried about on long journeys, being submitted to many variations of temperature and hygroscopic conditions of the atmosphere. After exposure and before development, it was kept five weeks. Other plates have been kept three months after exposure. I give these data as many folks' ideas of a "lengthy period" are various. I have plates, prepared early this year, which I am keeping on to test from time to time.

In exposure, very great latitude is allowable; an unspeakable boon to the photographer on a tour, with no conveniences for developing a trial plate from time to time. This last summer I took a number of plates away with me on a three months' outing, and exposed some of them from time to time on a variety of subjects, and many times felt quite at sea as to the proper exposure to give; and yet on my return home I developed every plate I had exposed into a decent negative.

Another point of importance is that the development is simple; entirely under control; and the most varied effects may be produced during its course by judicious use of the powers alkaline development gives us. Some may think it rather late to bring forward a slow process in these days of extra rapidity; but I, for one, require plates that give me *pictures*, and I must have materials over which I can exert some influence during the progress of the chemical changes which produce the visible image. I must be able to modify the action of the developer, both generally and locally, and so be able, to a certain extent, to raise the production of a negative from the region of mechanics to that of art. This we cannot do at present with gelatino-bromide plates, and, until the extra-rapid films are as much under control as the slower collodio-bromide, I shall surely keep to the latter for general work, reserving the "rapids" for special and exceptional cases.

Before giving my formulæ and working directions, I must (once for all) disclaim any claim of novelty. It has only been by making use of the experiences of many fellow-workers that I am able at last to give a formula with entire confidence, and you will find in it very little indeed that has not been published before, either by myself or others. It would unnecessarily take up your time were I to try and apportion the credit of each point to its proper author; and besides, it is not needed, as most of you are well acquainted with the whole history of emulsion work.

I have lately been asked if a commercial washed emulsion would not answer for the process as well as the one I recommend. Unfortunately, I have not succeeded nearly so well with any of the host I have tried, as with the one I am now about to describe. However, I have reason to hope the drawback of each one having to prepare his own emulsion will be speedily removed; one house having already requested permission to prepare it strictly according to my instructions, and to vend it under a distinct name.

And now to give the formulæ as briefly as possible. Prepare first a stock of plain collodion by dissolving 160 grains of ordinary pyroxyline in six ounces absolute alcohol and 10 ounces ether. Good methylated alcohol will answer for these first solvents, as also ether s.g. 730, purchasable at 1s. 6d. per lb. Also make an alcoholic solution of zinc bromide, 80 grains to the ounce. Even after filtering, this solution will throw down a deposit upon keeping, and this must be carefully left undisturbed. To make 10 ounces of washed emulsion, take 5 ounces of the above collodion and add to it one ounce of the zinc bromide solution, and 20 minims of syrupy lactate of ammonia.[*] Sensitize with 150 grains of silver nitrate, dissolved first in 80 minims of water, and then in three ounces strong alcohol. Boil together, and add it to the bromised collodion at once. I attach importance to the addition of the boiling solution, so as to raise the temperature of the mixture, and when only a small quantity (such as the above) is made, I take the precaution to wrap the bottle in a thick cloth to retain the heat as long as possible. On examining the portions just given, it will be seen the silver nitrate is decidedly in excess, and that the alcohol is used in larger proportion than usual.

Lactate of silver has long been a favourite addition of mine to emulsions, and I am more than ever pleased with its action. I must call attention to a curious effect which is produced if the bromised collodion is allowed to stand many minutes after the lactate is added, and before the sensitizing. The collodion becomes quite milky, and throws down a crystalline deposit. It is well to add the lactate immediately before the silver, or even to defer putting it in until after the sensitizing. I cannot pretend to say what chemical or physical effect occurs in the "lactised" collodion, I merely mention the fact.

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[*] Some experiments made since this paper was first written go to show that a great gain in sensitiveness may be obtained by reducing the proportion of plain collodion. I have tried three ounces, and even two ounces, instead of the five, with the most encouraging results. I am indebted to leaders in the *British Journal* for the suggestion.

The emulsion is ripe in about twenty-four hours; but I am disposed to think it an improvement to keep it for a longer time, up to three days. At the expiration of the ripening period twenty minims of strongest nitric acid are to be added, and the emulsion well shaken. I prefer to add the acid just before the washing instead of at first. I believe a better film is given by so doing.

We are now faced with the question of how best to wash the emulsion. Shall we pour it out and evaporate the solvents, or precipitate it? From a lengthened experience of both methods I cannot recommend precipitation, except in cases where the finished emulsion is to be used up within a month. It is now a generally acknowledged fact that precipitated emulsions will not keep well. But where large batches of plates can be prepared at a time, and no waste occurs, I can speak to the good qualities of the emulsion when precipitated by mixing it with twice its bulk of the following organifier, and when the pellicle has fully separated and set, washing for some time in water containing a little nitric acid (half-ounce to 1 gallon), and finally in several changes of pure water. The mixture—tannin, 500 grains; gallic acid and grape sugar, each 200 grains; strong acetic acid, 10 ounces, or a proportionately lesser quantity of glacial, to be dissolved in water, and make up to 100 ounces. This method is expeditious. The alternative, and I think the better plan, is to pour out the emulsion into a sufficiently large dish (1 ounce to 25 square inches, or say 5 ounces in a 12 by 10 dish). Evaporate the solvents more thoroughly than usual; in fact, the pellicle may be allowed to get almost dry. Wash first in water containing half-an-ounce of nitric acid in one gallon of water, and then in plain clean water for some considerable time. If the water in use is hard, distilled water should be used at first and lastly. Wash thoroughly. The extra drying of the pellicle, and the large proportion of alcohol it contained, will materially assist in shortening the time. When dry, dissolve the above quantity of pellicle in 5 ounces of pure absolute alcohol, and a like quantity of extra purified methylated ether, s.g. 720. An emulsion prepared in this manner with the lactate of ammonia will give excellent negatives without further preparation if the plates are used at once; but its subsequent treatment with alkaline albumen gives the especial qualities for which I so greatly value it. The plates are much quickened by the after treatment. This particular emulsion has its sensitiveness doubled, whilst some others are rendered slower.

A substratum is necessary for all plates above half-plate size, and I know of nothing for the purpose to equal the insoluble gelatine I introduced some little time ago. For convenience sake I repeat here the method of preparing and using it. Soak 60 grs. of Nelson's best sheet gelatine in water, drain, and pour on 10 ounces of boiling water. Then add two drachms of a ten-grain solution of chrome alum. Stir vigorously. Filter, and use whilst warm. Coat the plates without drying them after their cleaning, and, after draining, place them to dry in a box or cupboard with the lower edge resting on clean filtering paper. They must be completely desiccated before use. A good plan is to heat them singly, and to coat as soon as cold. Small plates may have an edging only, either of the gelatine or india-rubber; but I prefer to give them the full coating. It is less trouble by far than wiping and polishing the plates. Coat with the emulsion. When well set, immerse in water. I, myself, use a grooved box, well coated with shellac, and when I have coated and immersed as many plates as I intend to prepare, I cover up the box and thoroughly ventilate the room, so as to get rid of all fumes of alcohol and ether before proceeding further. I see no reason why a tin box with removable grooved pieces, similar to the one sent out by the Autotype Company for developing chromotypes, should not answer. Of course it must be kept for this purpose alone.

The plates are now to be flooded with the alkaline albumen, or dipped in a bath of it. In either case the albumen must be in contact with the film for at least a minute. The plate is then to be thoroughly washed, flowed with a preservative, drained, and dried. After backing it is ready for the camera. The albumen may be prepared in bulk, either with whites of eggs or with the pure dried preparation. Of the latter dissolve 60 grs. in 3 ounces of water, and add 1 drachm of strongest liquor ammonia 880. If white of egg be used, first pour in a few minims of dilute acetic acid, and well stir. In two or three hours strain, and to each ounce add two of water and one drachm of liquor ammonia.

For the "preservative" I have tried a host of substances, and find the simplest of all to be the best—viz., a two-grain solution of gallic acid. For the sake of constant uniformity and certainty I was anxious to discard from my formulæ all compounds of uncertain chemical constitution, such as beer, or even tea and coffee, or else I could, from my own experience, speak strongly in favour of a decoction of tea, made by boiling 1 ounce of compressed black tea in 4 ounces alcohol and 12 ounces water. One ounce of this is diluted with 10 ounces of water to form the final coating for the plate. It is of importance that the plates should be thoroughly dried, especially if intended for packing; as although these plates will stand exposure to a moist atmosphere better than most others, any damp remaining in the films when they are stored away will be a source of future trouble.

I trust I shall not be thought tedious if I devote a very short time to a description of my method of packing my dry plates. It is old enough, as both Mr. Gordon and I have used it for years, and I believe both of us have described it more than once. Cut some strips of cardboard a little more than a quarter of an inch wide, and glue them down on a piece of silk, strong muslin, or other flexible material, about one-eighth of an inch apart. When dry, cut with a sharp knife along the centre of each strip of cardboard, thus making a number of strips of flexible material with a strip of card one-eighth inch wide glued on each edge. For large plates the card may be wider. The space between the strips should be equal to the thickness of two plates. Cut the strips to the length of one side of the plates. To pack a dozen plates, lay one on the table face upwards, and taking two others in the hand place them back to back (without anything between), and put one of the card and linen guards over each end; lay these on the single one, and then on them place two others back to back as before, without any guards, then two others with guards, and so on until enough are thus laid in a heap, when we finish with a single plate, face downwards. It will be seen from this that two guards will suffice for four plates, and although the faces are kept away from one another by the strips of card, the backs of the plates have nothing between them. To protect the parcel of plates I wrap it first in very thin thin sheet gutta-percha, then in tinfoil, and finally in good brown paper. Although, perhaps, too expensive a method for commercial use, I consider it perfect for amateurs, who can use their cardboard guards and gutta-percha, &c., over and over again.

Returning to the plates themselves, the next point is the exposure. As I have before said, they are not very rapid, and it is well to give a full time in the camera.

In referring briefly to the development I may sum up my experiences in the form of a few maxims to be observed.

Beware of strong pyro. Use it very weak to begin with, from one-fourth to 1 grain per ounce, and add carbonate of ammonia and bromide of ammonium as the exigencies of the case may require. For a 7¼ by 5½ plate I usually begin with an ounce of water with ⅓ grain of pyrogallic acid, 1 drop of a saturated solution of ammonia carbonate, and a like quantity of a ten-grain solution of ammonium bromide.

Use patience, and do not hurry the development.

When all the details are out, a little stronger pyro will give plenty of intensity. Beware of making the image too intense; this is easily done.

By pouring the developer repeatedly from the measure upon one spot, especially if a little extra ammonia be used, local detail may be coaxed out, and by employing the same plan with stronger pyro local intensity is easily obtained.

With these plates the developer may be used almost like a painter's brush, and it is only by the intelligent and artistic use of all such means to an end that *pictures*, such as a true artist would value, can be produced by means of the camera.

In conclusion, I must again for a moment refer to the want of novelty in the foregoing. In some quarters I know a certain amount of curiosity has been excited about my new process, and although I have many times declared I was only working upon old ideas with a slight leavening of new ones, I fear a good many may be disappointed at first when they find there is really so little new after all.

All I can say is, I am thoroughly well satisfied with it, and feel amply rewarded for the years of labour I have devoted to emulsion work. I can only trust if others will strictly follow out the formulæ and directions given, they will be equally pleased with the certainty and simplicity of the process, and the excellent quality of its results, and I hope they will then feel as grateful, as I do myself, to the many experimentalists through whose united labours we are at last in possession of so good a process.

A CASE OF THE DESTRUCTION OF THE LATENT IMAGE ON WASHED EMULSION AND ITS RESTORATION.

BY L. WARNERKE.*

We do not nowadays hear much talk of proselytism, but I must confess I take great pleasure in converting a photographer from the wet process to the dry.

Some time since, my friend, Mr. Payne Jennings, and myself, discussed the question of wet *versus* dry processes, and I succeeded in getting him to solve it by actual experiment; and, being a great admirer of the high artistic skill of the solver, I endeavoured to do all in my power to make my favourite emulsion process a success in his hands.

Our scene of operations was Bolton Abbey, in Yorkshire, and, to be quite certain of giving proper exposure, I took down a tent and the necessary chemicals, in order to develop a plate occasionally. Two days before we started I got my friend's camera, and washed and varnished it, and this, as I expected, proved a perfect protection against spots, which invariably occur when a camera which has been long in use is employed for emulsion work. I took 12 by 10 plates prepared with washed emulsion, and without any substratum or preservatives, the surface of the glass before washing being rubbed with talc or French chalk to prevent the slipping of the film during development. We also had 12 by 10 plates to clean on the spot, and a good quantity of emulsion in bottles, together with sensitive tissue in blocks, and my own apparatus and roller slide. When we arrived at St. Pancras Station, and all our luggage was put together on the platform, I confess I felt uneasy, as the amount was not likely to impress my wished-for convert with the reputed portability of the dry process over the wet. After a day's travel we arrived at Bolton in the evening, but owing to a want of accommodation in the hotel, we were forced to convert a shed used for picnic parties into a regular laboratory. The next day we began our operations early, exposed a plate, and having erected our tent, developed it, and it proved perfect. So satisfied were we with our success that we proceeded to photograph the abbey and magnificent scenery with which we were surrounded, leaving development for a later period. In the afternoon of the first day we experienced windy weather, and from this time till our departure the weather broke up; but having made such tremendous preparations we decided to remain in Bolton to wait for fine weather, but everything was against us. One of the heaviest thunderstorms of the season caught us we were away in the woods some half-mile from the hut where we had left our reserve plate-boxes in the open. When we arrived, after the storm had somewhat abated, we found everything drenched, and literally drowned in water. The water in the hut covered the tops of some of the bottles, and mixed with the various chemicals used for development, giving them a dark brown tint, and floating in it was a portfolio containing exposed sensitive tissue—our hope, and my pride.

During the morning we tried to develop a plate or two, and they came out well, as did some of the drowned sheets of tissue. On our return to London, owing to press of business matters, we did not develop the remainder of the plates till a week had elapsed, and, alas! the first, second, and third plates proved complete failures, an unmistakable indication of the destruction of the latent image. After the ordinary treatment, the sky-line appeared, then fog, and no variation in the mode of development could save the plate. This was incomprehensible. I have seen a similar occurrence when the plate was kept a long time between development and exposure; but then a fortnight is not a long interval.

Casting about for a reason of this destruction, I could only account for it from the influences of ozone generated during the thunderstorm in Bolton, an opinion comformable to that held by Captain Abney.

Whatever the cause, I was greatly annoyed at the failure, but considering that an antidote must exist, I looked about for one.

I experimented on the tissue in my roller slide, and also in Mr. Skeen's, who accompanied me, and I was rewarded by complete success.

Cases of the sudden and inexplicable disappearance of the latent image on dry plates are recorded by many experimentalists, and hoping that the remedy I shall now describe may be useful in like instances, I have thus minutely entered into details.

After the plate is treated with alcohol and washed with water, it is immersed in a saturated solution of carbonate of ammonia, where it remains some four or five minutes. It is then drained and developed in the ordinary manner. I do not wish to enter into an explanation of the action of the carbonate of ammonia, because I cannot help being empyrical; but I cannot help putting on record that it dissolves away a certain amount of the silver compound (presumably oxide of silver) from the exposed plate, which can be detected by the adding of potassium bromide to it. There is every appearance that this salt is formed by atmospheric influence, and is the cause of the evil, and that it is soluble in the carbonate of ammonia. When it is removed the plate is just as amenable to development as when in its best condition.

I conclude these observations by stating that all Mr.

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* Read before the Photographic Society of Great Britain.

Payne Jennings' negatives on glass or tissue were successfully developed by means of this treatment; some of them are exhibited in this room. I now invariably adopt this method in developing every negative.

I may also mention that some very old tissues, exposed two years ago and not developed, gave me good results when so treated.

In my experiments, I treated only half the plates with the carbonate. I developed the two portions simultaneously. The difference in result is striking.

The following full report of the discussion appears in the Journal of the Society:—

Captain **Abney** observed, with reference to spots in emulsion plates, that though they were undoubtedly sometimes caused, as Mr. Cooper observed, by organic dust, he hoped to be able to show at the next meeting that dust was not the only cause, but that they arose from other circumstances within the ordinary experience of every dry-plate worker. Mr. Cooper, he noticed, attached great importance to heating the nitrate of silver, and closing up the emulsion to keep the heat in; and further on, he referred to the evaporating of the solvents to dry the pellicle. He (Captain Abney) did not see why these two operations should not be combined; that is to say, to evaporate the solvents by means of heat, and thus avoid the necessity of "cosying" up the emulsion. He was in favour of evaporating the solvents by distillation in preference to any other means. With regard to the lactate of ammonia used by Mr. Cooper, he stated that the crystalline deposit was probably lactate of zinc. He would recommend a modification of this part of the process. By the use of lactic acid, instead of lactate of zinc, lactate of silver was formed, and nitric acid set free, and thus the addition of nitric acid in a separate state was done away with altogether. He had found that by the use of albumen, great delicacy was produced, though he had chiefly tried it in combination with albumen, the result being a formation of a double salt of silver. This combination he strongly recommended. The use of gallic acid he thought was not so good as sodium sulphite. Gallic acid was undoubtedly of great excellence, but he preferred always, if possible, using a mineral substance as a preservative rather than an organic one. In recommending albumen it might be thought he was contradicting himself, but it should be remembered that the albumen in this case was of a colloidal character, and not crystalline.

Mr. **Sebastian Davis** said that during the summer he had made some experiments with emulsion in a simple form. Instead of using the bath in the preparation of his dry plates, he had used the emulsion, and then had proceeded according to the formula he had laid down in a paper read by him last session. This formula, by a singular coincidence, was very similar to that stated by Mr. Cooper. In using the simple cadmium bromized emulsion he had determined the exact quantity of bromide in solution by using paper impregnated with bichromate of potash in a similar form to litmus paper. This paper was dipped into the emulsion, and showed the presence of an excess of silver by turning red; bromized collodion was then added by degrees until a state of neutrality was reached. He (Mr. Davis) wished to draw attention to a defect in the emulsion process which he believed all workers in it had met with. This defect was a mottling in the higher lights, more apparent when the collodion was poured over the plate than when a bath was used. A reduction in the amount of pyroxyline had been recommended in the emulsion, and he had tried this plan of reducing the quantity from five grains to two grains per ounce. He had found that this reduction materially lessened the mottling, but he had not, owing to the bad weather, been able to test the method definitely, or whether it made any difference in the picture. He believed this tendency to mottling was the greatest difficulty the worker in the emulsion process had to contend with.

Mr. W. **Bedford** observed that his experience as to mottling was, that it was due to the quality of the pyroxyline. If it were of the proper quality there was no mottling, and by the emulsion process he had been able to obtain results equal to the wet.

Mr. **Davis** remarked that he had used pyroxyline made according to the formula recommended in the paper read before the Society, and other samples which were generally considered the best for the purpose.

Captain **Abney** said that it was a common practice with him, for the last two or three years, after emulsion had been standing and had settled down at the bottom, to decant half and add fresh solvents, and so get rid of half the pyroxyline. He was inclined to think, after a good many trials, that the emulsion was better if made with the full amount of pyroxyline, and the latter lessened afterwards, although of course this method might be considered a wasteful one. If the pyroxyline were diminished it was necessary to use a preservative of some kind, or the plates would not keep. It should be remembered that the collodion itself was a kind of preservative from atmospheric influences.

* * *

PROOFS.

The *St. Louis Practical Photographer* has some good remarks from a correspondent on showing proofs and obtaining prepayment. Referring to another correspondent, who said, "Charge for each negative, and collect pay for it, and make the amount large enough to cover retouching and one proof; . . . if not satisfactory, and your customer desire it, make another negative, and collect your pay again for work done; let them persist in giving away time, chemicals, and self-respect,"—Mr. Hall remarks:—"Now I consider that 'time, chemicals, and self-respect' is the sum total of a photographer's stock-in-trade. The end in view is to make money and elevate the art. To this end it is necessary to sacrifice time and chemicals. As to self-respect, an artist who has the true appreciation of his relations to the public cannot call it sacrificing self-respect by making re-sits and proofs for the purpose of satisfying public demand. I apprehend no artist will so consider it, unless it be those over-sensitive ones who, having established a reputation for good work, regard any dislike a customer may have for a sitting as questioning their artistic qualifications. Those who take this view assume a false position. Rarely does a photographer know the true every-day expression of his customers, and if the first sitting does not correctly represent the person, though the chemical work is perfect, a second sitting should be given free. Were I to give heed to Mr. B.'s ideas, and put them in practice, I should have to say good-bye to some of my best customers. Mr. B. says, 'This free negative taking is all foolishness, the merest fol-de-rol.' Now, let us see. A few weeks ago a lady and gentleman came into my gallery for some photographs. As usual, I made two of each. The next day proofs were shown, which were not quite satisfactory; another sitting was given, and two more negatives of each made; from these I got orders for four dozen prints price $10; a few days after two other members of the family came and got one dozen each, $6; shortly after this a fifth person, who got one-half dozen, $2. Now, let us sum up and see if so much free negative taking was 'mere fol-de-rol.' In the first place, I know for a certainty, had I attempted to charge for each negative, I should have lost the entire job. The cost of the extra negatives, proofs, and time was $1. The result of the work is as follows: Six and a half dozen photographs, $18; net profit above all expenses, $10.

"We are servants of the public just the same as any other tradesmen, and the fact that our profession rises to the dignity of art does not release us from our obligation to the public. All mankind are servants, one of another, and we cannot deny the fact.

"At $3 per dozen we can well afford to show proofs from two or even three or four negatives in some cases, which, with proper care on the part of the operator, will rarely occur. Figuring right down to actual cost, a 4 1-4 by 6 1-2 negative does not cost ten cents in ordinary galleries. Our time is valuable, of course, but few of us, I think, are so crowded but that we can devote all the time required to give patrons satisfactory results, and at the same time increase instead of losing our self-respect."

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VARIETY OF STYLE IN PORTRAITURE.

Amongst the numerous provoking and depressing defects which prevail amongst photographic portraits, there is one which towers high above the rest in its frequency and prevalence—we had almost written, its universality. The defect to which we refer is not confined to the work of inferior or second or third-class photographers: it prevails largely in the work of many first-class portraitists, whose work in other respects is excellent. We refer to uniformity of style—a dead level of unvaried style; one style of lighting, one style of posing and arranging the sitter, one style of composition and choaroscura, one depth of printing, and one character of tone prevailing in every picture sent out of the establishment. The effect is bad enough when it chiracterises the work of any one large establishment; but the evil does not end there. Next in offensiveness and prevalence amongst portraitists has been the tendency to imitation. A fashion of style set by some high-class establishment is followed religiously, if not servilely, by hundreds of others, until a certain effect—and sometimes a very bad style—is regarded by them as inevitable in a photograph. For many years after the first introduction of photographic portraits on paper—we make the distinction because a better style prevailed in Daguerreotypes—a character pervaded every portrait to be met with. A clean, smooth-looking print was the highest aim. The portrait was characterized by a clean smooth white face, with the features duly indicated, but rarely a trace of modelling was seen. The face and hands—the flesh generally, in fact—was of the same tint as the linen or other white draperies. An even flat tint was the highest aim in backgrounds, and when this was free from streaks and spots it was regarded as a high achievement. There were regulation chairs, tables, &c., with occasionally a regulation pedestal and balustrade. The whole treatment combined to give not only an unvaried effect, but a common-place effect to photographic portraits.

There were, indeed, a few bold innovations in these days, the work of capable amateurs. Dr. Diamond, a highly-cultured connoisseur and amateur of mezzotint engraving, produced portraits with modelling, and light and shade, after the manner of the masters of mezzotint. Hill and Adamson were audacious enough to introduce a painter's style into calotype portrait. But professional portraitists did not, as a rule, follow suit. With the exception of Rejlander and Robinson, we do not remember any who introduced this kind of work into professional portraiture. Two agencies eventually combined to modify this prevalence of flat moon faces without texture or modelling. Mainly the introduction of the works of Mons Adam-Salomon, which came upon English photographers like a revelation, and we presume upon photographers throughout the world also, for the same faults prevailed, and the same change was effected. And in a secondary degree the change was effected by the introduction from America and Germany of what was termed the "Rembrandt" style. Since then the prevalence of the gloomy, heavy-shadowed style, where it was suitable and unsuitable alike, has become almost as great a nuisance as the flat clean style was. Nevertheless, the revolution was a wholesome one, and we may eventually see a general application of various styles because they best suit individuals, not because the photographer has got into a certain Procrustean mode of working which must be applied to all comers.

But one of the especial forms of this defective lack of variety, to which we would venture to call the attention of many very excellent portraitists, is the tendency to foster certain mannerisms of pose which, for their own sakes, are worth avoiding, as it suggests poverty of conception when a number of the portraits are seen together, as they must be in a specimen room or a specimen case. A specimen case full of excellent pictures is apt to produce an unpleasant effect if it present a score of different persons all treated alike—all with the same turn of the head, all with the same pert elevation of the chin, and all with the same, or nearly the same, position of the figure, and the same disposition of the same accessories. A discriminating observer will be apt to turn from such a collection of specimens, remarking, "These cannot be all characteristic likenesses—they are so like members of one family, which they cannot really be." To interest and secure customers it is important to arrest their attention by variety. Variety of treatment in a series of portraits suggests individuality in each, and nothing probably pleases better in portraiture than character and individuality.

Variety in treatment requires, of course, variety of idea and conception. To this end we commend a constant study of the great masters of painting. Not for the purpose of imitating them; imitation generally fails. But the study of their works will stimulate conception and invention, and aid the artist in securing variety without resorting to the vulgarity of slavish imitation.

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BOISSONAS' RAPID WET PROCESS.

We have received a communication from M. Boissonas requesting us to notify to English photographers that M. Klary is no longer his agent, nor is he responsible in any way for that gentleman's tuition. He further adds that he has reason to believe that the instructions issued by that gentleman in his name are not accurate or complete, and most generally issue in failure. As we gave much publicity to the demonstrations we saw in Paris, we feel bound to publish this caution on the part of M. Boissonas. This gentleman wishes us to notify to all who have taken lessons from M. Klary that although he has not received any part of the fee, he is unwilling, for his own honour and the credit of his process, that subscribers should be misled, and that on receipt of their names and addresses, with evidence that they had paid M. Klary for lessons, he will send to each complete formulæ and instructions. He begs us to add that the formula we recently received from a Paris correspondent, and published, is incorrect, and can only lead to disappointment.

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A LOSS TO JOURNALISM.

It will interest all who are in the habit of reading photographic journals to learn that a highly esteemed and able photographic Editor is about to quit the ranks of journalism. Mr. J. Traill Taylor, who has for nearly fifteen years been Editor of the "British Journal of Photography," retires from that journal at the end of the present month, and at the end of the first week in the New Year sails for the United States. Whilst quitting journalism, Mr. Taylor does not entirely dissociate himself from photography. He has, however, arranged to devote himself to its commercial phases, in which he will, we hope, find higher prizes than are easily attainable by the journalist. Mr. Taylor has entered into partnership with an old-established firm, the business duties in connection with which lead him to New York, where his future residence for the present will be. Mr. Taylor will take many good wishes with him, and leave behind him not a few regrets for his loss. During his fifteen years' residence in London, his ability, energy, and unfailing good humour have made him many friends, and the vacancy created by his departure will not readily be filled. Of his journalistic position it does not become us to say much, but it has been patent to every one that his energy and attention to his journal were unfailing, and that not only did he exercise his editorial office with tact and discretion, but that much of the most interesting matter in his pages proceeded from his own pen. A suggestive illustration of this is found in the fact that contemporaneously with his departure, the "Peripatetic Photographer" also disappears from the journal. In the somewhat delicate relation of a contemporary journalist, involving something of rivalry, we have ever found him personally courteous and fair, and give him a hearty God-speed in his new enterprize.

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MR. CROOKES' GREAT DISCOVERY IN PHYSICS.

Some marvellous experiments have recently been made by Mr. Wm. Crookes, F.R.S., formerly Editor of this journal, in which he discovers, that matter may exist in a fourth state, a condition beyond any hitherto known; a state in which the exploded corpuscular theory of light holds good; and where light, instead of moving in straight lines, moves in varying curves. These propositions, it must be remembered, are not the phantoms of a crazy enthusiast, but propositions made before a scientific body, and demonstrated by scientific processes. The sober record of the *Times*' reporter, which we quote, will more fully explain. The *Times* says:—

> "There was an unusually full meeting at the Royal Society last week to hear Mr. Crookes announce his recent discoveries, and to witness a repetition of some of the experiments which have led to them. In experimenting with electric discharges in vacuum tubes he has especially examined the dark space which appears round the negative pole of an ordinary vacuum tube when the spark of an induction coil is passed through it. He has used different kinds of poles, varying intensity of spark, and different gases, and has from time to time devised fresh arrangements for giving greater certitude and exactness to particular observations. The very remarkable conclusion to which he has been led is that the phenomena he has witnessed, which are not accidental, but are such that he can under like conditions reproduce them, reveal to physical science a new world, where matter exists in a fourth state—ultra-gaseous, he has termed it—where the corpuscular theory of light holds good, and where light does not always move in a straight line. A discovery which all at once adds to our knowledge of the three states of matter (the solid, the liquid, and the gaseous), a fourth state, "ultra-gaseous," which shows that under certain conditions the rejected Newtonian emissive theory of light is true, and which furnishes a plain optical illustration of the fact that light may travel in curves—curves, too, which may be made to continually vary—instead of moving in straight lines, as has been believed it always does, is a discovery which deserves to be called 'epoch-marking.'
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> "Mr. Crooks was very careful to prevent any misconception as to what he meant by emissive 'light.' His paper will not be ready for publication for some time, but in the notes he read he said that in speaking of a ray of molecular light he had been guided more by a desire for conciseness of expression than by a wish to advance a novel theory. He considered, however, that the comparison in these special circumstances is strictly correct, and that he is as well entitled to speak of a ray of molecular or emissive light when its presence is only detected by the light evolved on its falling on a suitable screen, as he is to speak of a sunbeam in a darkened room as a ray of vibratory or ordinary light when its presence is only to be seen by interposing an opaque body in its path. In both cases the invisible line of force is spoken of as 'a ray of light,' and if custom has made this correct as applied to the undulatory theory, it cannot be wrong to apply the expression to emissive 'light.' It is not easy in mere words, without diagrams of the apparatus for reference, to make Mr. Crooks' recent experiments generally intelligible. Those acquainted with the phenomena of the passage of induction sparks in vacuum tubes, and with Mr. Crooks' various forms of radiometer, will be perhaps able to gather some idea of the processes from the following explanation:—He has arranged vessels capable of high exhaustion, such as he has used for his radiometers, and through these has passed induction discharges, sealing in terminals at either end. In this way he has studied the identity of the illuminated lines of molecular pressure with the invisible molecular strain he has been for so many years observing. By introducing a cup-shaped fixed disc, which is made the negative pole, he has been able to show the focus of the lines of force. At very high exhaustions the whole bulb becomes illuminated with greenish yellow, or, according to the glass, other coloured phosphorescent light. This commences at different exhaustions with different gases. It will not turn a corner in the slightest degree, but radiates from the negative pole in straight lines, casting sharply-defined 'shadows' of anything placed in its path. On the other hand, the ordinary luminous phenomena of vacuum tubes will pass along any amount of curves and angles. From a study of these shadows Mr. Crookes advances the theory that the induction spark actually illuminates the lines of molecular pressure caused by the electrical excitement of the negative pole. He considers that the greenish yellow light is caused by the direct impact of the molecules on the surface of the glass. The 'shadows' are not optical, but are molecular shadows, only they are revealed by an ordinary illuminating effect. The mechanical action of projected molecules has been studied, and will be described in the paper. The focus of heat of molecular impact was shown by an experiment allowing the focus from a nearly hemispherical aluminium cup to fall on a strip of platinum foil, when the heat rose to the melting point of platinum. The deflection of the stream of molecules by a magnet was also shown. The conclusions as to the existence of an 'ultra-gaseous' state of matter arise from theoretical speculations as to the state in which it exists in these highly exhausted vessels. The modern idea of the gaseous state is based upon the supposition that a given space contains millions of millions of molecules in rapid motion in all directions, each having millions of encounters with others in a second. In such a case, the length of the mean free path of the molecules is excessively small, as compared with the dimensions of the vessel containing it, and the properties which constitute the ordinary gaseous state of matter, and which depend upon constant collisions, are observed. By the great rarefaction which Mr. Crookes has, by years of experience, been now able to obtain, the free path of the molecules may be made so long that the hits in a second are negligible in comparison with the misses, and the average molecule is allowed to obey its own motions or laws without interference; and if the mean free path is comparable to the dimensions of the vessel, the properties which constitute gaseity are reduced to a minimum, and the matter becomes exalted to an 'ultra-gaseous' state. Then new and very decided properties come into play."

NOTES ON THE PLATINOTYPE PROCESS.

BY W. WILLIS, JUN.[*]

The process I have the honour of illustrating to you to-night depends upon principles which may not be known to all here; I will, therefore, with your permission, commence by giving a short sketch of them.

Ever since the dawn of photography it has been well known that ferric oxalate is very sensitive to light, and that thereby it is reduced or converted into ferrous oxalate. This piece of paper I have here has been coated with ferric oxalate, and has since been exposed to light under a negative. The image formed by light, which, though rather faint, you can distinctly see, consists of ferrous oxalate. But I discovered some four or five years ago that ferrous oxalate, when dissolved in a hot solution of potassic oxalate, instantly reduces the metal from chlorides and other salts of platinum.

This flask contains some ferrous oxalate. On pouring into it a solution of potassic oxalate and heating the mixture, you see that the ferrous oxalate has mostly dissolved, forming a reddish solution. Now, on dropping some of this platinum salt (K_2 Pt. $Cl._4$) into the flask, you perceive that the latter salt has been decomposed; the black powder which is now subsiding is metallic platinum.

Now, suppose a platinum salt is mixed with the ferric oxalate with which we coat the paper, we shall find upon exposing such paper to light that the ferric salt only is affected, being changed into ferrous salt, as in the first experiment; but the particles of this ferrous salt are now in contact with platinum salt. If now this isolated paper be floated on a hot solution of potassic oxalate, its ferrous image will be dissolved by the potassic oxalate, but we shall expect that at the moment of solution it will reduce, *in situ*, some or all of the platinum salt so intimately mixed with it. This is what really occurs, and the result is a picture in pure metallic platinum.

Until very recently I had discovered no means of getting down the platinum in a sufficiently fine state of division without the aid of a preliminary coating of silver salt. Now, however, I have overcome this difficulty. By adding a platinum salt to the developer I find that the metal is reduced in a very fine state of division.

Having given an outline of the principles upon which the process is based, I will now proceed to show how it is at present conducted.

The following materials are used:—Plain paper, or paper having a slight additional sizing of some colloid. A solution of ferric oxalate, containing about 130 grains of the salt to each ounce of water. A solution containing 30 grains of potassic-chloro-platinite, and 3 grains of plumbic chloride to each ounce of water. A solution containing in each fluid ounce 120 grains potassic oxalate, and 7 grains potassic-chloro-platinite.

A sheet of the paper is now suitably fastened on a plane surface. Equal quantities of the ferric oxalate solution and of the potassic chloro-platinum solution are mixed, and two fluid drachms of the mixture are evenly spread over the paper by means of a piece of flannel wound round a glass rod. The paper is now hung up to dry; as soon as all surface moisture has disappeared, the drying is finished before a fire or stove. The paper is now ready for exposure under a negative. I may here remark that this sensitised paper has kept perfectly good in a dry atmosphere, both before and after exposure, for more than a month.

The time of exposure may be determined by an actinometer or by simple inspection, preferably by the former method. The length of exposure is about one-third of that required in ordinary silver printing.

I have not shown these operations of sensitising and exposing, because they are so exceedingly simple, and you are probably familiar with similar ones.

Now here are some papers which have been sensitised and exposed in the manner just described. The visible image is formed in ferrous oxalate; light has produced no effect on the platinum salt lying in contact with it. I will now float this print for a few seconds on this hot solution, which contains potassic oxalate and potassic chloro-platinite. On raising it you will see that the brownish ferrous image has been converted into a black one, an image or picture in metallic platinum. The potassic-oxalate dissolved the ferrous image, and the solution thus formed, before or at the moment of leaving the surface of the paper, reduced the platinum salt in the manner I have previously described. The image, as I have just said, is now in metallic platinum, one of the most stable substances known to chemists, perfectly unalterable by any atmospheric influences, not oxidized in the air at any temperature, and not attacked by any single acid or alkali.

The following remarks are reported in the Journal of the Society.

In reply to the President, Mr. Willis stated that gold could be used instead of platinum.

Mr. S. Davis inquired what was the composition of the platinum salt. The ordinary composition of the salt was 2KCl., Pt.Cl.4, forming a double salt or bichloride of platinum.

Mr. Willis said the salt he used was quite different, the formula being 2KCl., Pt.Cl.2.

Mr. Davis pointed out that if ferric oxalate were reduced by the action of light to ferrous oxalate, it would also be affected in bulk in a similar way to what it appeared to be in the pictures produced by the process demonstrated that evening.

Mr. Spiller apprehended that Mr. Davis wished to know whether the ferric oxalate was affected by light when in solution.

Mr. Willis: Undoubtedly. The ferric oxalate when in bulk or solution is reduced by sunshine to ferrous oxalate, and carbonic anhydride can be seen making its way to the surface until the ferrous oxalate is thrown down. The action of light on this salt is quite independent of any organic substance whatever.

Mr. Davis: It would be necessary, then, to prepare the ferric oxalate out of the influence light?

Mr. Willis: Yes; and to store it in the same way.

Mr. Davis: The ordinary salt as purchased would not answer the purpose?

Mr. Willis: It is of no value whatever.

Mr. England: Do the prints require much washing?

Mr. Willis: About ten minutes after removal from the ferric oxalate, and about three changes afterwards of ten minutes each.

Capt. Abney observed that the ferric oxalate was one of the earliest photometers used. Draper, somewhere about 1840, showed that the ferric oxalate in the presence of light was gradually reduced to the ferrous state. The amount of carbonic anhydride given off was measured to find the intensity of the light. He (Capt. Abney) had largely experimented with ferric oxalate, and was very much astonished to hear that the prints would keep between exposure and development. He had noticed that in thundery weather the ferric oxalate was very readily reduced, and he had sometimes been enabled to develop prints within so short a period as an hour after exposure.

Mr. Willis thought this rapid deterioration might be explained by the fact that oxidation only took place when a certain amount of moisture was present. Ferrous oxalate was soluble in an acid solution of ferric oxalate, and when this condition was produced by moisture in the paper the picture was destroyed. If two pieces of paper were prepared, and one kept in a chloride of calcium tube, and the other left in the room, say where the meeting was now being held, in the course of a week the one in the room would be found to have almost entirely lost its impression. One could imagine that when the salts were lying side by side the slightest alteration would be sufficient to set up decomposition. He had always found that pictures kept for a time in presence of moisture had faded. The prints exhibited that night had been exposed on the previous Friday, and had been kept since in a dry atmosphere.

Mr. Jabez Hughes thought that Mr. Willis had scarcely done himself justice in one important particular. When the process was first introduced to the photographic world, it was felt there was in it a weak element, arising from the use of a secondary action by means of silver, and to get rid of the silver the use of sodium hyposulphite. Now, in the process shown that night, this weak element had been eliminated, and it must be admitted that this was a distinctive feature of advancement. He thought that in justice to Mr. Willis this fact should be acknowledged.

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[*] Read before the Photographic Society of Great Britain.

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REACTIONS OF THE CHROMIUM ACIDS AND CHROMATES ON ORGANIC BODIES.

BY DR. J. M. EDER.*

Having described the behaviour of chromated gelatine under all circumstances, the author next proceeds to treat of what he says is an often discussed but yet comparatively unknown subject—that is, the suitableness of the different kinds of gelatine for photographic operations; he also investigates the methods of proving the various gelatines.

When the bichromated gelatine process was first discovered by Talbot, no attention was paid to the quality of the material that was employed; but it was soon found that by using the finer kinds of glue or gelatine a much better and more reliable result was obtained. Modern photographers employ only the best white or colourless gelatine in the collotype and carbon processes.

Ordinary carpenter's glue when soaked in water forms a mass that must be heated for a long time over the water bath before it melts; even when melted, it often contains tough and stringy pieces, which render the formation of a homogeneous film almost impossible. Besides, if this kind of glue be dissolved, and then made to set, it forms a not very rigid jelly—one, therefore, which does not possess sufficient power of resistance for many purposes, as, for example, that of the collotype process. Many of the commoner kinds of glue can be easily and completely dissolved, but when set they form a jelly that soon melts, and which is therefore of no use for the carbon process. Some sorts also contain a considerable quantity of fat. Chromate-photography has therefore to depend entirely on gelatine; this substance is much purer and more reliable than glue, though the various sorts of it that are found in commerce are of very different quality. The properties of gelatine vary, in the first place, with the material from which it is produced, for bone-gelatine, skin-gelatine, parchment-gelatine, and isinglass, are all very different; and, in the second place, with the method by which it is obtained from the same material. Suggestions as to a means of estimating the multifarious gelatines are, unfortunately, wanting, as also are indications of the effect of a preponderance of chondum, or glutin, in photographic gelatine.

In order to obtain a starting-point for the discussion of these questions, the author analysed (by various methods) a large number of gelatines of different origin. By combustion of dry gelatine he obtained an ash, whose composition was then determined by moistening it with ammonic carbonate, so as to reduce any caustic lime that might be present to carbonate, and then by raising it to a moderate red heat.

For determining the amount of water, he dried the different gelatines at a temperature of 120° C. till they were of the same weight. In order to estimate the value and serviceableness of the gelatines, he employed two methods. The first of these depends on the assumption that the quantity of water taken up by a gelatine in the cold is proportional to its excellence—though this is not universally true. A piece of the gelatine to be proved is accurately weighed, and then allowed to lie for twenty-four hours in water at a temperature of 15° C.; at the expiration of this time it swells to a soft jelly-like mass, and this is taken out of the water, carefully dried with filter paper, and weighed.

It should also be observed that good gelatine, when soaked, not only colours the water very slightly, but also gives a tolerably colourless jelly. The second, and, perhaps, more reliable method, is that in which the value of gelatine is estimated by its consistency and carrying power. Five grammes of the gelatine to be proved are dissolved by heating in 45 c.c. of water after it has been first soaked in the same, and the solution is then allowed to set at a temperature of 15° C. For this operation, glass beakers must be used, having the same diameter. Nearly every gelatine will set at this temperature when dissolved in the above proportion; but should any specimen not do so, it may be at once dismissed as useless. As soon as it sets, a strip of sheet iron, having a hole in the centre, is fixed across the beaker; a piece of wire moves vertically in this hole. To the lower end of this wire, and at right angles to it, is soldered a piece of tin plate, the shape of a watch glass, about 1·15 centimetre in diameter, with its convexity downwards; to the other end is fixed a funnel capable of holding 1½ kilogramme of small shot. The weight of the wire and funnel must be accurately taken. According as the jelly, on which the lever end of the instrument rests, is more or less dense, so the funnel must be loaded with a greater or smaller quantity of shot to cause the instrument to sink into and tear the jelly. From the weight of the shot used for this purpose the relative value of the gelatine as regards its carrying power may be determined.

This last method of proving gelatine is of great value in chromate photography, more especially in the collotype process, because by means of it the power of resistance to mechanical pressure of any particular sort of gelatine can be numerically determined. A gelatine that has been proved by this method capable of bearing a great weight without being injured, crushed, or torn, can also bear to be often printed from in the collotype press without being spoiled. Gelatines of the best quality are able to sustain a very heavy pressure without tearing; when the pressure is removed, they resume their original shape and position without the least alteration. Exactly the same qualities are required of a good gelatine for collotypes. The method above described, therefore, was found by the author to be one rendering the greatest service to photographers.

As the image formed in the gelatine, after exposure to light, is formed by the reactions of chromium oxide, the author also determined the power of resistance of a gelatine thus altered. He dissolved 5 grammes of the gelatine in 35 c.c. of water, and added a solution of 2·5 grammes of chrome-alum in 10 c.c. water; consequently the degree of concentration was the same as in the former case. After standing for twelve hours to set, it was then proved for resisting power by the same method.

The author has also determined the melting point of gelatine that had been dissolved and made to set again, and for this purpose he used a 10 per cent. solution. The mass was heated over the water bath, and the temperature determined at which melting commenced. It was found that the better kinds of gelatine had much the same melting point, but that it fell very low with the inferior kinds.

(To be continued.)

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* Continued from page 580.

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COLOURING AND FINISHING BRASS WORK.

To prevent the every-day rusting of brass goods, the trade has long resorted to means for protecting the surface from the action of the atmosphere, the first plan of which is to force a change to take place. Thus, if brass is left in damp sand, it acquires a beautiful brown colour, which, when polished with a dry brush, remains permanent and requires no cleaning. It is also possible to impart a green and light coating of verdigris on the surface of the brass by means of dilute acids, allowed to dry spontaneously. The antique appearance thus given is very pleasing, and more or less permanent. But it is not always possible to wait for goods so long as such processes require, and hence more speedy methods became necessary, many of which had to be further protected by a coating of varnish. Before bronzing, however, all the requisite fitting is finished and the brass annealed, pickled in old or dilute nitric acid till the scales can be removed from the surface, scoured with sand and water, and dried. Bronzing is then performed according to the colour desired; for although the word means a brown colour, being taken from the Italian "*bronzino*," signifying burnt brown, yet in commercial language it includes all colours.

Browns of all shades are obtained by immersion in solutions of nitrate or the perchloride of iron; the strength of the solutions determining the depth of the colour. Violets are produced by dipping in a solution of chloride of antimony, or of permuriate of iron. Chocolate is obtained by burning on the surface of the brass moist red oxide of iron, and polishing with a very small quantity of black lead.

Olive green results from making the surface black by means of a solution of iron and arsenic in muriatic acid, polishing with a black-lead brush, and coating it, when warm, with a lacquer composed of one part lac-varnish, four of turmeric, and one of gamboge.

A steel-grey colour is deposited on brass from a dilute boiling solution of muriate of arsenic; and a blue by careful treatment with strong hydrosulphite of soda.

Black is much used for optical brass-work, and is obtained by coating the brass with a solution of platinum, or with chloride of gold mixed with nitrate of tin. The Japanese bronze their brass by boiling it in a solution of sulphate of copper, alum, and verdigris.

Success in the art of bronzing greatly depends on circumstances, such as the temperature of the alloy or of the solution, the proportions of the metals used in forming the alloy, and the quality of the materials. The moment at which to withdraw the goods, the drying of them, and a hundred little items of care and manipulation, require attention which experience alone can impart.

To avoid giving any artificial colour to brass, and yet to preserve it from becoming tarnished, it is usual to cover properly cleaned brass with a varnish called "lacquer." To prepare the brass for this, the goods, after being annealed, pickled, scoured and washed, as already explained, are either dipped for an instant in pure commercial nitrous acid, washed in clean water, and dried in sawdust, or immersed in a mixture of one part of nitric acid with four of water, till a white curd covers the surface, at which moment the goods are withdrawn, washed in clean water, and dried in sawdust. In the first case, the brass will be bright; in the latter, a dead flat, which is usually relieved by burnishing the prominent parts. Then the goods are dipped for an instant in commercial nitric acid, and well washed in water containing some argol (to preserve the colour till lacquered), and dried in warm sawdust. So prepared, the goods are conveyed to the lacquer-room, where they are heated on a hot plate and varnished.

The varnish used is one of spirit, consisting, in its simple form, of one ounce of shellac dissolved in one pint (imperial) of methylated spirits of wine. To this simple varnish are added such colouring substances as red sanders, dragon's-blood, and annatto, for imparting richness of colour. To lower the tone of colour, turmeric, gamboge, saffron, Cape aloes, and sandarac are used. The first group reddens, the second yellows the varnish, while a mixture of the two gives a pleasing orange.

A good pale lacquer consists of three parts of Cape aloes and one of turmeric to one of simple lac-varnish. A full yellow contains four of turmeric and one of annatto to one of lac-varnish. A gold lacquer, four of dragon's-blood and one of turmeric to one of lac-varnish. A red, thirty-two parts of annatto and eight of dragon's-blood to one of lac-varnish.

Lacquers suffer a chemical change by heat and light, and must, therefore, be kept in a cool place and in dark vessels. The pans in use are either of glass or earthenware, and the brushes of camel's-hair, with no metal fittings.—*Ironmongers' Review.*

Correspondence.

PRICES IN PHOTOGRAPHY.

Dear Sir,—In a recent article on Photography in Paris you stated that the average price obtained in Tunbridge Wells, Brighton, Leamington, &c., for a dozen carte photographs was £1 (or £1 1s.). I beg to say that 10s., or half that sum, would have been nearer the mark. Mr. ——, of Tunbridge Wells, charges 10s. or 10s. 6d. for a dozen cartes, and I this morning received a letter from a customer, saying that Mr. ——, of Leamington, charges 10s. for a dozen vignettes. What the prices are in Brighton I cannot say; but I believe all the other photographers in Tunbridge Wells charge 6s. a dozen. If Mr. —— and Mr. —— each charge 10s. a dozen, might I ask who is to keep up the prices? For, I believe, photographs, like pictures, are valued more by their cost than by their intrinsic value.—I am, yours obediently,

Flowergate, Whitby, Dec. 13th. Frank M. Sutcliffe.

PS.—Can you tell me what an "architectural negative retoucher" is? Messrs. —— were advertising for one the other week. Surely our old abbeys, castles, &c., do not undergo a touching-up business, and have all their wrinkles, spots, and cracks filled up, and made to appear fresh from the builder's hands!

SENDING MONEY IN ADVANCE TO ADVERTISERS.

Dear Sir,—It might be as well to warn your readers against sending money in advance to advertisers they know nothing of.

This week I have had two customers writing me that they have sent their money for goods to be sent in one week, and they have waited three weeks, and had written several times, but got no reply. I found the advertiser had left the address, owing rent, and no trace of him; and was coolly told, when I made known my business, "There are plenty more besides you would like their money back."

You cannot be responsible for the advertisements that appear in your paper, but our country friends certainly would do well to inquire before they send their money to perfect strangers.—Yours truly, C. E. Elliott.

36, *Jewin Street, E.C., Dec. 12th.*

[As Mr. Elliott very truly remarks, we can have no responsibility for advertisements which appear in our columns, as we do not necessarily know anything of the advertisers. We have no hesitation, however, in endorsing the advice to make enquiries before trusting strangers with money in advance for goods or work. Most provincial photographers have some London house with whom they do business, of whom they could make enquiry. Above all, we should recommend country photographers to do business with establishments of known respectability, and not to be tempted, by announcements of unfairly low prices, into risk.—Ed.]

MR. COOPER'S EMULSION PROCESS.

Dear Sir,—The state of my health not allowing of my being in London this season, I was not present at the last meeting of the Photographic Society, and thus was prevented from hearing and replying to Captain Abney's remarks on my paper on a "Reliable Dry Process."

In reference to the use of heat in evaporating the solvents, I have not yet tried the Captain's plan of saving the ether and alcohol by distillation, but I invariably use a certain amount of warmth, by standing the dish containing the emulsion on a large hot water tin, with some thin slips of wood to prevent actual contact, until the boiling water in the tin has somewhat cooled down. This has for so long a time been a part of my ordinary practice, that I rather stupidly forgot to mention it in my paper.

I have a capital box in which I can stand hot water tin and dish, close it up, and carry it into the open air. A strong current of air then passes through it, without a ray of light getting in. As I greatly object to breathing the vapour of ether, I find this convenient. Sometimes I have placed the dish of emulsion in a large dark cellar.

As to the substitution of lactic acid for the ammonia salt, I have purposely used the latter, so as to avoid the presence of free nitric acid in the emulsion during the progress of its ripening.

I regret that a rule of the Society's necessitated the cutting out of the name of the maker of the pyroxyline I recommend for my process.

There are many sorts in the market, and each has some very distinctive features. The one I use is a low temperature cotton (its price proves this), and it is perfectly soluble to the extent of ten grains to the ounce, giving rather a tough film.

I cannot see much harm in my mentioning that Hopkin and Williams are the makers. The knowledge may save some trouble and disappointment to those trying the process.—I am, yours sincerely, HENRY COOPER.

Homehurst, Torquay, December 14th.

THE RECENT MEDALS AWARDS.

DEAR SIR,—I should be pleased to know what is the object of Col. Wortley's letters. It appears to me that the correspondence may be summed up in the maxim, "Ex nihilo nihil fit."

If I correctly understand the Colonel's epistles, he wishes your readers to understand that he did not get prints to his liking. To me, however, it seems that this is exactly what he did do. He evidently wished for prints in haste to condemn at leisure, or he would not have summoned to his aid the imaginary gentleman going in such a terrible hurry to India or Afghanistan. The demand, I am told, was so urgent that one might have thought the capture of Shere Ali himself in his capital at Cabul depended upon the rapid delivery of the order.—Yours truly, PAYNE JENNINGS.

Only *one* set of prints were ordered by the agency firm, and these are the identical copies in question.

THE NEW PLATINUM PROCESS.

SIR,—Can you, or any of your readers, inform me where I may procure the potassic chloro-platinite, suitable for Mr. Willis's platino-ferric oxalate process, or briefly describe a simple and effective way of preparing it?

PHOTOPRAGMATICUS.

TRANSFERRED ENGRAVINGS.

SIR,—In your last week's issue appeared a quotation from the *Scientific American*, headed, "Transferred Engravings." May I bring to the notice of your very numerous readers that the process described is no other than the "Anastatic" process, invented some years ago by Mr. Rudolph Appel, an employé in the Ordnance Survey Office at Southampton.

The process has been published officially, at some length, several times, and is therefore no secret. In consequence I am desirous, and actuated by the good old principle of rendering to Cæsar that which belongs to him, and to the *Scientific American* that which it can claim.—Yours truly, W. B. D.

WHITE HARD VARNISH.

SIR,—Having noticed somewhere in the NEWS, I think, that what is called hard white varnish diluted with alcohol makes an excellent negative varnish, I purchased a gallon, and, after diluting, varnished a number of negatives with it; but now find that every negative so varnished has commenced to peel off in flakes, rendering them perfectly useless, and, unfortunately, as often happens in similar cases, some of the negatives cannot be replaced. I may probably not have succeeded in obtaining the proper description of varnish to start with, but in case others should get into a similar trouble, would advise that a varnish expressly prepared for the purpose be used.—Yours truly, A. JOHNSTON.

Proceedings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE annual dinner of the above Society took place on Tuesday, the 6th of December, at Mrs. Main's "Peacock Hotel," Newhaven. Owing to the unfavourable state of the weather the company was not as large as it otherwise would have been.

Mr. W. H. DAVIES, one of the originators of the Society, occupied the chair, and Mr. M. G. DOBBIE, honorary secretary, acted as croupier. The dinner was served in Mrs. Main's best style, and ample justice was done to it by the company, whose appetites were sharpened by the strong Nor'easter which was lashing the Firth into fury, and rendering the roads almost impassable by snow drifts.

On the removal of the cloth, the CHAIRMAN, in a neat and humorous speech, gave the first toast of the evening—"The Queen, and all the Members of the Royal Family." Before doing the honours, however, he remarked that the gentleman who drew up the programme must have been napping here, for was it not a fact that Her Most Gracious Majesty was something more than a Queen—was she not also an *Empress?* Therefore the toast should be "The Empress, and Members of the Imperial Family."

The next toast was "The Army, Navy, and Volunteers," with of course the Reserves. In proposing this toast the Chairman said that no great nation could exist now-a-days without a standing army. The Reserve Force was the outcome of true voluntary patriotism on the part of a loyal people. This little island of ours could not hold its true position among other nations but that its principles were backed by sound military preparedness in all parts of the world. Our motto was "Defence, not Defiance;" yet, if called on to defend our hearths and homes or those depending on us, we would find our noble army, navy, and volunteers ready, willing, and able to undertake the duty.

Mr. YOUNG replied on behalf of the army and volunteers, and Mr. PRINGLE, in replying for the navy, informed the company that he at one time held the proud position of captain, and that on one occasion at least he had been engaged in active warefare—on the banks of the Canal, on a recent photographic picnic—he at the time being captain of the barge which was interfered with by a set of roughs, near Colinton Bridge. He would not blow his own trumpet by reminding the company how the foe was vanquished, the deeds being all embalmed in the archives of the Society.

The toast of the evening, "The Edinburgh Photographic Society," was given by Mr. ROBERT RUSSEL, who remarked that though not a professional photographer, he took a deep interest in the beautiful art-science practised throughout the world. His experience assured him that this Society was one of the most influential in the empire. It did its work right well and thoroughly, and its popularity and great success was ample proof of the truth of the statement.

Mr. DAVIS, whose name had been coupled with the toast, replied. He could not allow the opportunity to pass without stating this publicly, that ever since the Society was instituted—nearly nineteen years ago—it had maintained an even steady course, and had accomplished more real valuable work during that period than, perhaps, any other society in the kingdom. Not only so, but its work had been carried on uniformly with energy and enthusiasm, unaffected by petty matters which would mar its character for usefulness and instruction. This good result, he said, was largely due to the skilful management of the affairs of the Society by its Council. It was also plain that recently the Society was markedly extending its influence. The members could but congratulate themselves that for the small annual subscription of five shillings the Council were enabled to carry out the objects for which the Society was instituted so successfully and satisfactorily, and he trusted its membership would still increase, and its already good name would continually grow even more honourable.

Mr. SIMPSON proposed the next toast, "The Office-bearers and Members of Council." In doing so, he referred to the admirable way in which the affairs of the Society were managed, and he trusted that the gentlemen who were elected from time to time to such honourable positions would ever be jealous for the advancement of art study, and do everything in their power to encourage a love for true art in conjunction with the science of photography.

Mr. ALEX MATHISON, in reply, said he believed each individual officer was, in his official capacity, wholly devoted to the interests of the Society, and during the last year there had been complete unanimity in all the proceedings of the Council. This was exactly as it should be, and the proceedings of the Council being so heartily endorsed by the Society made the duties—not always light—anything but burdensome. Mr. Mathison concluded by saying that whereas, when he first joined the Society, he was actuated wholly by a love of photographic art, he had since his election to the position of treasurer added thereto an intense love of the five-shilling subscriptions, and he was gratified to find that it had been determined to give another presentation print this year, as he believed it to be a great stimulus to subscriptions, the picture alone being worth the whole subscription. By thus acting liberally he was certain the membership would still increase, whilst the funds in his hands would not suffer.

The next toast was proposed by Mr. F. P. Moffat: "Photographic Literature." Mr. W. H. Davies, in replying, said there was a vast number of volumes of what was considered to be photographic literature—quite a library, in fact—dating from the time of Sir Humphrey Davy to the present day. He was afraid that during the last three or four years this class of literature had been distinguished more for a multiplication of words than ideas. Still there was a demand for literature relating to photographic art, and publishers and printers found a ready market for their publications, which, after all, was simply carrying out the law of supply and demand. One work he would like to see reprinted, and he was sure it would have a successful run, *i.e.*, Cuthbert Bede's contributions to the comic literature of photography.

The Croupier, in a flowing and characteristic speech, gave the toast "Kindred Societies," which was responded to with full honours.

During the evening Messrs. Pringle, Howie, Moffat, Young, Hannah, and Reid entertained the company with some capital singing and music.

Mr. Howie proposed the health of the Chairman, and the meeting separated satisfied that the evening had been agreeably and profitably spent.

Talk in the Studio.

The Nature of the Elements.—A crowded meeting of the Royal Society met on Thursday evening last, when Mr. J. Norman Lockyer, F.R.S., read a lengthy paper, in which he discussed the evidence derived from spectroscopic observation of the sun and stars and from laboratory experiments, which has led him to the conclusion that the so-called elements of the chemist are in reality compound bodies. His conclusions were based on a careful examination of the spectra of the various so-called elemental bodies, in many of which he found extra lines characteristic of compound bodies. The *Times*, in a long report, says that chemists will hesitate to accept his conclusions until they are assured by physicists that his facts are not explainable on other hypotheses, adding that chemists are careful to teach that what are at present regarded as elements are not necessarily simple bodies, but merely substances which they are unable to decompose, or which they have no special reason to regard as compound bodies. The remarkable relations, both in atomic weight and properties, existing between many of the elements tend, indeed, to show that they are related in the manner Mr. Lockyer supposes.

Alleged Illegal Possession.—At Hammersmith Police Court, Robert Bennett, a dealer, living in Peckham, and Edwin Young, a photographer, who gave an address in the London Road, Southwark, were brought up for re-examination on the charge of being in the unlawful possession of watches. It appears that Bennett first pledged a watch at the shop of Mr. W. Ayres, a pawnbroker at Chiswick, and gave a false name and an address in Hammersmith. Soon afterwards Young, acting under the direction of Bennett, went in with another watch and said he lived in Kingston. The assistant, suspecting that it was a "duffer," refused to take it in and detained it. That brought in Bennett, who claimed the watch. He had other watches in his possession. Being taken into custody, he said he bought the watches at a sale, polished them up, and pledged them at the shops of pawnbrokers, who, on finding that they had been done, "duff" the public. Mr. Paget fined Bennett £5, or one month's imprisonment, and Young £3, or 21 days' imprisonment. Notice of appeal was given, and bail allowed.

To Correspondents.

⁂ Notice to Advertisers.—As the next number of the Photographic News will be published on Tuesday next, Announcements intended for insertion in that issue should reach the Publishers not later than mid-day on Monday, December 23.

⁂ The Year-Book of Photography for 1879.—Our Annual for the ensuing year is now in course of preparation. In order that it may in the fullest degree fulfil our intention in its issue we are always anxious that it should embody as much as possible the most valuable experiences of the ablest workers, and so help to keep its readers abreast with the progress of the art. We shall esteem it a favour if all our readers who have interesting details to communicate, however unimportant they may seem, so long as they are practical, will send us brief, terse papers for the Annual they have all received with so much favour.

J. C. Brietbart.—The most sensitive dry plates which we know at the present time are emulsion plates, details of several of which we have published recently. Mr. Wratten gave details during the year of a very sensitive gelatine emulsion process; and a few weeks ago we published Mr. Bennett's emulsion process, which is very sensitive. Our present issue contains details of Mr. Henry Cooper's emulsion process, which does not profess to be one of the most sensitive, but is very excellent in its results. It is impossible to repeat in this column full details of a process, but you will find full instructions for several processes in our forthcoming Year-Book, which will be ready shortly.

An Amateur and Subscriber.—The contrivance in question is American. The description, as you would see, was quoted from an American journal; but it appeared to us suggestive enough to enable an ingenious person to apply the idea. Sheets of coloured gelatine may be purchased of most fancy stationers, and sometimes of confectioners.

A. B.—We should say that under no circumstances is it right publicly to exhibit as a specimen a photograph produced by another photographer, except by his permission. If a painter has coloured a print for a photographer on approval, and the work is not accepted, the print remaining as a specimen in the hands of the painter, the latter might without impropriety show the picture as an example of his work; but it should not be publicly exhibited in any way. There are many reasons for this. The original sitter might object, and the photographer might thus be injured. If the print be exhibited in another photographer's premises, the latter is taking the credit of work he has not produced, and conveying an impression that the sitter was his patron, whilst it was not so; and in both these cases injuring the original photographer. We think that any honourable man will readily see this, and forbear to exhibit after he receives an intimation of the facts.

A Novice.—To remove the stopper from a bottle of collodion, and place it near the fire, is a very dangerous practice. The evaporation of the ether will make the collodion thick, glutinous, and unmanageable, and the vapour being very inflammable, there is great risk of igniting it, and causing an explosion.

A Twelve Years' Subscriber must have seen many articles in our columns on copying paintings. The space at our command in this column is quite insufficient to give details. Good bromo-iodized collodion, bath in good condition, and iron developer all working satisfactorily for ordinary work, will answer here. If the painting be old and dark, moisten its surface with water to which a little glycerine is added. This will bring out detail in the appearance of the painting. Take care that it does not dry in patches whilst copying. Set it up in a good light shining direct upon it not from one side, and take care that it is quite perallel with the camera, and give full exposure. Sometimes it is desirable to throw a black cloth over the brass-work of the lens, which may be reflected in the glossy surface of the picture. Use care and judgment. Experience is of great value. There are, we believe, books on the renovation or restoration of paintings, but it is a dangerous task except in experienced hands. There is a chapter on the subject containing many good hints, in the "Carver and Gilder's Guide," published by Kent and Co. The application of a little lukewarm water with a sponge is the utmost that is safe in inexperienced hands. Sometimes this is sufficient to make a great improvement in a painting which has become coated with smoke, &c., from long hanging in the atmosphere of a room containing a fire. Sometimes the varnish requires removing, which is easily done by an experienced person, but is almost impossible with safety to a novice.

G. E.—Pure glacial acetic acid generally crystallizes at 50° Fah. But crystallization is not a sure test of strength or purity. Sometimes a trace of sulphurous acid, a dangerous impurity, is added to acetic acid, because such addition makes the acid more readily crystallize.

Photopragmaticus.—There will be no difficulty in your being present, should the demonstration be given. You may mention our name as introduction.

Several correspondents in our next. We regret that communications often reach us just previous to our going to press on Thursday, to which it is impossible to give attention until the following week.

The Photographic News.

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PHOTOGRAPHY IN AND OUT OF THE STUDIO.

The Disassociation of the Elements—The Electric Light in London.

The Disassociation of the Elements.—Mr. Norman Locker's interesting speculations, which have lately excited so much attention, are deserving of much consideration by all who study the science of chemistry and physics. That the theories enunciated are at utter variance with those taught to us by chemists will not go for much at the present day, if Mr. Lockyer can show a sound basis for his arguments, and this can hardly be denied. At any rate, he is fully justified in placing his belief on record when the results upon which it is based are the fruits of such exhaustive work as Mr. Lockyer has done. One thing will at once strike the readers of this journal, who have read Mr. Lockyer's paper, and that is the great extent to which photography has been employed by that energetic worker: no less than 2,000 photographs of the spectra of all the various metallic elements have been secured by Mr. Lockyer, and it is upon these, as also upon Mr. Huggins's fine star photographs, and those obtained during recent solar eclipses, that the new elemental theory is based. If we understand Mr. Lockyer aright, he would have us believe that instead of there being many metallic and non metallic elements, there are in truth but very few. The metals, by whatever name we know them—iron, tin, gold, and silver—are all of elements, and are not elements themselves, and Mr. Lockyer believes that by volatilising one so-called element, it may be possible to form another. Thus calcium, for instance, if volatilized, yields a product which, on examination under a spectroscope, proves to be strontium, or, at any rate, what physicists have hitherto called strontium. And if this is the case with one of the so-called elements, why should it not be with others? Mr. Lockyer holds that he has proved that the higher the temperature at which a substance is examined under a spectroscope, the more simple will be its spectrum, and this is evidence that the substance has resolved itself into its simple elements. The ordinary way to use the spectroscope, as our readers know very well, is to heat the substance under examination to incandescence, and to look at it through the prism in this condition. Through the slit provided in the instrument we see coloured bands and lines, some thick and distinct, and others weak and fine. As different substances show different lines, the means of analysis afforded by the spectrum is a very ready and favourite one. The more complicated a substance, the greater the number of lines shown, and hitherto chemists have employed this mode of identifying elements. But Mr. Lockyer tells us the presence of all these lines is simply due to the fact that the substance under examination has not been sufficiently heated. If, instead of having recourse (say) to a spirit lamp, we employ the voltaic arc or some other means of raising the temperature, the spectrum lines disappear in a great measure, and only a few simple ones remain behind. Thus, Mr. Lockyer points out that the spectrum of our brighest, and therefore hottest stars differs materially from others. The sun, which is one of the least brilliant, yields a spectrum in which are to be recognised various metal lines, whereas in spectrum photographs of Sirius, the most brilliant of our stars, none of these are to be seen, and the lines are very few. If a metal is present in large quantities in any substance under examination, the lines are seen very long and distinct; and if you decrease the quantity of this metal until but a trace is at hand, if the other lines do not gradually disappear, the longest and strongest of them all is diminished. When this latter finally disappears, proof is at hand, says Mr. Lockyer, that metal no longer exists, although there may be minor lines which might excite suspicion. By heating, the substance, Mr. Lockyer thinks, first of all is resolved into the so-called elements, which are visible by their lines in the spectrum, and when the temperature is further raised these so-called elements are futher decomposed or disassociated into more simple ones still. Hydrogen lines, it appears, are even altered in super-heated spectrum, the substances to which Mr. Lockyer seems to have given special attention being that element together with calcium, lithium, and iron. All these so-called elements change their spectrum when the temperature at which they are examined is raised. Thus there is, as we have said, ample to justify Mr. Lockyer in bringing forward his theory that what we have regarded hitherto as elements are not elements at all. He has in any case put forward a problem not easily to be demolished, and demolished it will have to be if we are still to have faith in spectrum analysis. In future we shall have to specify, at least, the temperature at which a substance has been examined under the spectroscope, if the result is to be worth anything, and to disprove Mr. Lockyer's assertions it will not do to cite optical proofs, but photographic ones. The eye is so liable to err, and, moreover, is such an imperfect recorder—so far as the violet end of the spectrum is concerned—that none, unless they can bring the confirmatory evidence of the camera, can expect to gain credence. One thing in connection with Mr. Lockyer's investigation must not be forgotten, namely, the amount of hard work it has cost him during the past four years. His views deserve the more respect on this account, and should not be regarded too lightly by those to whom they may at first sight appear wild and preposterous.

The Electric Light in London.—Those who have witnessed the electric lamps upon the Embankment can never believe otherwise than that they will not be banished from the river side again. Though yielding a comparatively soft and subdued light, they still send forth rays over the river sufficient, at any rate, to light that silent highway half across, and if we had but a row of similar lamps on the Surrey side, the illumination would indeed be perfect. The only surprise about it all is, that we should have remained so long waiting when so valuable a thing was within reach. For lighting large places and squares there cannot now be a doubt that electricity will force in its way, and the only point is how much further it can be made useful for everyday purposes. For public illumination it is hardly a question of cost at all. If the electric light were to cost twice or four times as much as our yellow gas, it might still be desirable on account of its greater illuminating power. The river between Waterloo and Westminster glimmers as brightly as if a full moon were shining, and this valuable result is secured without too much glare under the lamps themselves. Some there are who have quarrelled with the engineers for employing such opaque globes, which deaden half the light; but it is just the vividness of the electric spark, such people should remember, which more than anything else has stood in the way of introducing the light before. The old electric light shone with such piercing vividness that none could bear to look at its rays, while the shadows it threw were so pitchy black as to render things more invisible than before. The great aim has been to secure more light, while the lamps shall not affect the eye more than an ordinary gas-burner, and now that this end has been will nigh attained, we have people crying out that the gas and electric lamps are hardly to be distinguished. In respect to taking photographs by the electric light we see that the Stereoscopic Company have been following on the heels of Mr. Vander Weyde, who was the first to apply electric illumination for the purpose. Electricity was, however, as our readers know very well, employed some years ago for printing purposes by the Woodburytype Company, Disderi, Goupil, and others.

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FRENCH CORRESPONDENCE.

Woodbury's Filigree Films—The Taupenot Process—Vidal's Photo-types—Lamy's Actinometer—Report on the Photographic Section of the International Exhibition—New Photographic Society.

Mr. Woodbury's Improved Photographic Films.—At the last monthly meeting of the Photographic Society of France on the 7th December, Mr. W. B. Woodbury sent for exhibition some very curious drawings in filigree; these he obtains by means of pellicles of bichromated gelatine on paper which is treated as in the ordinary carbon process, with the exception of being first submitted to hydraulic pressure. Recently other experimenters, and especially M. Blaise, of Tours, have on different occasions produced results of the same kind; at the same time, this does not in any way detract from the merit of the inventor of Woodburytype in this application of the process.

Old Plates prepared by the Taupenot Process.—At the same meeting, M. Ferrier showed some very excellent negatives taken by him on plates of albumenized collodion that were prepared in 1863—or fifteen years ago—and had been put by in a corner of his laboratory, where since that time they were forgotten. These remarkable productions serve to illustrate the precious qualities of the Taupenot process, especially as regards the durability of the plates. In pointing this out, the exhibitor, a highly-skilled operator, declared that he had no hesitation in recommending this process as the most perfect of all those that can be used for dry photography.

Illustrated Works in Phototypes—M. Leon Vidal submitted to the notice of the Society at this meeting a new work published under his superintendence, and executed in the workshops of the *Moniteur Universel.* It is in the form of an album, and bears the title of *Ailes et Fleurs*—or, as we might say in English, "Feathers and Flowers"; it contains twenty phototype plates reproduced from a series of charming drawings, the work of the pencil of Giacomelli. This work may be regarded as a *pendant* to that entitled the *Album des Mois*, which was produced by M. Vidal in 1876, and obtained a well-merited success. M. Vidal exhibited at the same time also the last issued numbers of a work of his, the *Tresor Artistique de la France*; these, like the previous numbers, contain reproductions by the photochromic process of some of the exquisite works of art in the collections of the Louvre. Every one present agreed in admiring the beauty of these plates, and in recognising in them remarkably faithful copies of the masterpieces to popularise which is the object of the publication.

A New Actinometer.—At the same meeting of which we have been speaking, M. E. Lamy showed an actinometer, an instrument for measuring the action of light during the process of printing on carbon tissue, and for determining in minutes of exposure to a *good light* (*i.e.*, in the shade, about noon) the depth of printing in negatives. In order to arrive at a solution of this problem, M. Lamy first of all selected three useless negatives, the first of which was weak, the second of moderate strength, and the third vigorous. He placed these negatives in three printing-frames containing each a piece of his own carbon tissue, No. 10, previously sensitized in a three per cent. solution of bichromate (this is the quickest kind for paper positives), and exposed them about noon, shaded from direct sunlight. As a general rule, the weakest portrait negatives require an exposure of from six to nine minutes, those of middling strength one of ten to thirteen minutes, and the more vigorous ones an exposure of from fourteen to seventeen minutes. For the present purpose the negatives are each exposed for one of these durations of time; for instance, the first one for eight, the second for twelve, and the third for sixteen minutes. After developing, the prints are examined; if they are a little too weak or too vigorous, the operation must be repeated from the beginning, extending or reducing by some minutes the times of exposure, as may be necessary. When the proper degree of development of the prints is exactly hit upon, each of the negatives is marked with a figure corresponding to the number of minutes required for the necessary exposure. In this way be obtained three typical and numbered negatives for comparison; they may be framed and hung up in a corner of the studio. From this table of comparison (if we may call it so) we are able to determine easily, rapidly, and accurately the length of time required for printing from any negative. To do this we must place the negative, whose time has to be determined, side by side with each of the three standard negatives, and view them together by transmitted light; we can then judge whether it corresponds in intensity with either of them. If the agreement with one or other of them be complete, all we have to do is to gum a label bearing the number of minutes of exposure required on the standard negative (or more simply to scratch the number itself) on the back of the negative that is being tried. Should it, however, not agree exactly, it will be easily seen to arrange itself, as regards intensity, either between some two of the standards, or below the first, or above the last. By this observation we are able to approximate very closely to the required time of exposure, and can mark with the right number of minutes any negative that we have thus compared. We can then deliver them to the printer, who, guided by these numbers, and with the aid of *actinometers* ruled and numbered to correspond, can at once produce, either on carbon tissue No. 10, or on tissues that work with the same rapidity, prints that will develop to exactly the required degree of intensity without any previous trial. Actinometric paper is prepared by immersing for ten minutes Rives paper (of eight kilos.) in this bath:—

Distilled water	100 c.c.
Ammonium chloride...	2 grammes

After drying this salted paper, and marking it on the face, it is floated for about four minutes on a silver bath of the following composition:—

Distilled water	100 c.c.
Silver nitrate	12 grammes
Citric acid	6 ,,

The acid introduced into this bath gives the paper the property of keeping white; however long ago the paper may have been prepared, it acquires exactly the same tint when exposed to the light, and with exactly the same degree of rapidity. M. Lamy exhibited at the meeting a sheet of paper prepared three months ago, which had remained as white as it was on the first day. As regards the instrument itself, it differs considerably from all the various photometers that have been hitherto devised. Its standard tint (there is only one) is pink-grey; by the help of this one tint, concurrent with that of several glasses more or less dark in colour, and more or less thin, the necessary effect is obtained. This standard tint is unchangeable, for the colouring material is enamelled, and applied to paper. A hole underneath which the silver chloride paper is made to slip is cut in this paper, and the latter is gummed on to a piece of coloured glass, and placed in the opening of the cover, in order to form the table of comparison for the instrument. Inside the apparatus a narrow strip of actinometric paper is rolled up on an axis, and kept in its place by a small spring; a few centimetres of it are unrolled, so as to enable the tip to pass out of the external opening. The cover is then put down, and the instrument is ready for use. Reading the tint is easy, and is made externally on the table of the cover, without its being necessary to touch the instrument. To renew the piece of actinometric paper that has been used, it is only necessary to pull out a little more by the protruding tip. When the instrument is thus arranged, and placed in a good light, it will be seen that the portion of the actinometric paper visible across the hole assumes the same colour as the enamelled standard in ten seconds; but if the enamelled paper and the opening be covered with a light green glass, and the whole be exposed to the light, it will take fifteen seconds of exposure to produce the same effect. The length of the time of exposure necessary to obtain the same result increases proportionately with the intensity of colour of the interposed glass.

A Report on the Photographic Section of the late Paris Exhibition.—Previous to the opening of the Exhibition the *Societe de Secours Mutuels des Employes en Photographie* had announced their intention of publishing, at their own exexpense, a report on the Photographic Section of the great International Competition, to be drawn up by a committee of delegates appointed for the purpose. This report, whose publication has been delayed by unforeseen circumstances, has just been issued. It has been drawn up with great care, and evidently by men who have technical knowledge, but, as might be expected from this latter circumstance, its authors are much freer with criticism than they are lavish of commendation. From motives of courtesy, however, for which credit is due to them, they have shown themselves much less severe in criticising the works of foreigners than in their remarks on those of their own countrymen. In this distribution of praises, which as I have said, they seem to have reserved entirely for our guests, England especially comes in for a goodly share. On the whole, this report contains much of interest from various points of view, and though we cannot share all the opinions expressed in it, we are bound to express our sense of their impartiality, and to recognise the knowledge of the art which is displayed, and which could only have been acquired from the results of daily experience.

Proposal for a New Photographic Society in France.—At the moment of writing these lines, I have received a circular signed by several of the photographers of Paris, calling a meeting of their colleagues with the object of developing a project for the formation of a new Photographic Society. I am not in a position to say what will be the issue of this proposition, but I cannot but wish it success; everything which tends to draw closer together those who are engaged in our profession must have a beneficial effect on the progress of the art.

Ernest Lacan.

ON THE SUBJECTIVE AND OBJECTIVE OF PICTORIAL PHOTOGRAPHY.

BY EDWIN COCKING.*

The title of this paper may possibly seem to be too metaphysical, and, therefore not practical; yet, at the same time, the meaning of the terms used so well express what is desired to be understood, that we shall accept them as the further carrying out of another term more frequently used when speaking about photography, viz., Art-Science.

Now the terms subjective and objective may be accepted as representing certain conditions, which, at first sight, might appear to be almost similar, but which, when closely analysed, are found to be very different.

Primarily, the term subjective refers to something arising from within the individual self; and the term objective to something outside oneself. Thus anything that bears the impress of mind upon matter, and which I, myself, create, is subjective; that which already exists, and which others create, is to me objective.

Now, probably, there is scarcely any other subject in which these terms can be so justifiably used as in photography, and just in proportion as one side or the other be cultured and made the serious study of its votaries, so will the results tend towards the progress of its dual nature—Art and Science; but, unfortunately for the subjective, with which is connected the art side of photography, it must be closely united to the objective, with which is associated the science side of photography; and as the one depends upon emotion and feeling for success, it becomes difficult to reconcile or mix this up with the other side, which, being composed of facts, has nothing at all to do with emotion or feeling.

Hence, as it is far easier to imitate a physical model than to follow a mental example, so we find that the objective, or so much of the science of photography as is necessary for its manipulatory practice, can be and has been imitated to a great amount of nearly equal success, and the outcome exists in the general capacity to produce good negatives, so that on this side great progress has been made.

On the other hand, the power of using the subjective side of photography, so as to impress an art value upon the work done, has been less cultivated, and, therefore, much less progress made.

In considering this matter, I purpose only to take the subjective side of photography, and, as a matter of fact, it must be self-evident that all that emanates from oneself must be *subjective*, hence it follows that not a single pictorial photograph exists which does not bear an impress of its producer's individuality, whether it be good or whether it be bad.

Now the important question arises, Can photography be made the medium for the visible existence of art conceptions? The reply must be, Most certainly. But as I have hitherto always most carefully endeavoured to formulate in estimating its value, it should never be subjected to the same method, either of appreciation or criticism—that appertains to the products of Fine Art.

And in passing, it may be observed that it is owing to the forgetfulness of this guiding principle that so many artists as well as critics of the public press, when speaking of photographic art, seem to entirely put out of thought peculiarities which accompany the production of pictures by the agency of science; and so, whilst it is very easy to condemn work as not approaching to some standards in Fine Art, it is seldom pointed out what is really praiseworthy and capable of further culture and advancement in an Art direction. Why, then, is it that more artistic culture has not been brought to bear upon pictorial photography? One great reason is this: in its manipulative operations so much exists that is purely objective—viz., outside and beyond artistic impress—that hitherto the educated artist has disdained to use it for any other purpose than as a fixed substitute for original positions and detail.

And very naturally this, to some extent, must always be the case with those who have given time to train the hand not only to imitate what the eye sees, but also whilst doing this to impress upon the work an individuality unmistakably different from the hand-work of another artist.

Hence what is wanted amongst photographers is not the academical student, but more of the cultivated connoisseur; one who, to succeed, must use his thinking faculties in training latent art feeling, in cultivating a taste for what is beautiful, and in studying how the masters in art, in producing their pictures, worked upon matter by impressing upon it their own emotions and feelings, and those only who can be touched by such pictures will succeed in finding out the motive power which was the germ of the successful work. And in considering this matter, we must never forget that the subjective in photography is made evident by a totally different mode of working to that necessary in fine art. The photographer can so little impress his work through the

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[*] Read before the Photographic Society of Great Britain.

agency of the hands, that the popular notion has arisen, and consequently assertion been made, that photography possesses no subjective power, when possibly fifty pictures by fifty different people all show an equality in objective work, but where the subjective has been completely down at zero.

It therefore follows that any training of the hands to obey the impulse of artistic culture is unnecessary in photographic study; but, at the same time, it lays a most difficult task upon the mind, which has to design, carry out, and perceive the entire picture in all its detail—modelled in absolute reality before any pictorial fac-simile can be produced. It is this fact which makes the thought of producing pictures so almost impossible to those who, possessing latent art tendencies, try to give an existence to the same through the agency of photography.

Having so far endeavoured to explain what I have in view, it may be asked, Why use complicated terms to express a simple idea? The reply must be, that as the subjective side of photography is almost totally a purely mental operation, it follows that the mind alone needs training; and as one means to that end, I cannot but think the constantly having before us some word or phrase which shall serve as the watchword which immediately brings to mind a distinct and leading principle, will cause some amount of *thinking* to understand, and thus the commencement is made in the direction of the study required.

At some future opportunity I shall go further into the subject, closing this paper with the words of an eminent living American theologian, recently spoken:—"An artist is a man who has the power of changing an idea into a thing; no man is fit to paint a picture who merely copies. The man that simply makes a portrait of a man is an artisan—he is respectable, but he is only an artisan; whilst the man who has a mind so rich that he sees something that the man suggests as well as that which the literal photographer depicts. The man who moves in a larger atmosphere, and beholds the more subtle relationship of things, and has power so to reproduce them in matter that others can see or feel them, even if they cannot analyse them—that man is an artist."

* * *

ALL IN A CARTE.

Scene.—*The Waiting Room of a Publishing Photographer's. Popular Celebrities discovered in readiness for their sittings. Enter Mrs. Peacock, who is received by Polite Employe at the door.*

Polite Employe. We are rather busy this morning, Madam; but, doubtless, you come by appointment?

Mrs. Peacock. Certainly (*giving pasteboard*). Here is my card.

Polite Employe (*looking at his list*). Oh, yes, of course, the lovely Mrs. Peacock! I trust, Madam, that you have brought a ball-dress with you? Mr. Kammerer particularly wishes to take at least one of the portraits in décolleté costume.

Mrs. Peacock. My man has, I believe, the larger part of my wardrobe in boxes in the hall.

Polite Employe. A thousand thanks, Madam! Mr. Kammerer will have the honour to attend upon you immediately.

Aristocratic Bride (*in white satin and orange blossoms*). I trust that Mr. Kammerer will see me as soon as possible. I have been waiting here for some time.

Polite Employe. Certainly, my Lady, certainly. But you see there will be a greater demand for Mrs. Peacock's carte than for yours at the moment. Mr. Kammerer thinks it better to keep your Ladyship's picture back until after your Ladyship's marriage. It will be published simultaneously with the account of your Ladyship's nuptials and wedding presents in the morning papers.

Aristocratic Bride (*with an unpleasant look at Mrs. Peacock*). I can't help feeling that Mr. Kammerer is neglecting me for others.

Polite Employe. On the contrary, my Lady, Mr. Kammerer is most anxious to take a really popular portrait of your Ladyship. He has ordered a special background, representing the castle in which your Ladyship purposes spending your honeymoon.

Mrs. Peacock (*with a scornful glance at Aristocratic Bride*). I must have a castle in the background, too. If Mr. Kammerer does not provide one, I shall go off at once to Messrs. Strutt and Stareleigh. They have been boring me for weeks to give them a sitting.

Polite Employe. Certainly, Madam. You shall have any background you please; although Mr. Kammerer thought that perhaps the sea-shore would be appropriate to one of your cartes—with, perhaps, a bathing-machine in the middle distance.

Clerical Dignitary. I hope that Mr. Kammerer will not keep me waiting *much* longer. I have a Missionary Meeting to attend, and——

Polite Employe. Certainly, my Lord. I think you wish to be taken in your vestments. (*Clerical Dignity looks displeased.*) I beg pardon. I was mixing up your Lordship with the Ritualists. I should have said lawn-sleeves.

Miss Sallie Plantagenet, nee Sarah Snooks (*entering briskly*). Now, then, young man, look sharp! I have got a rehearsal on at the Revelry Theatre at eleven, and I shall only just have fifteen minutes to slip on my togs, give the guv'nor a sitting, pop into my brougham, and get to the stage door in time to save a fine.

Aristocratic Bride
Mrs. Peacock. } *together* { Surely, Mr. Kammerer will not presume to give this young person a sitting before any of us!
Clerical Dignitary.

Miss Sallie Plantagenet. Come, I say, who are you calling "a young person"? As young as you please—but person, indeed! I am sure my cartes sell just as well as Mrs. Peacock's, or any of the swell beauty-women; and as to the Bishop's, why he's just nowhere. But there, don't let's quarrel. I daresay this young man will settle it for us somehow. Won't you, my dear?

Polite Employe. Certainly, Madam; I hope your Ladyship will excuse the delay. (*To Mrs. Peacock and Aristocratic Bride.*) Oh, pray don't think of going, ladies. Mr. Kammerer will be so distressed, and the public will be so disappointed. Oh, do think of Mr. Kammerer and the public.

Miss Sallie Plantagenet (*good-naturedly*). Don't get the poor young man into trouble. I say—what rot our nagging like this, when we shall all be next-door neighbours in the shop windows for the next two years! (*To Aristocratic Bride.*) Look here, *you* are togged already, and *she* (*pointing to Mrs. Peacock*) is readier than me, as *I* have to make up my face, and get into my never-mention-'ems, so you two shall be taken first; and by the time you are done the Reverend gent and me will be in our war paint. There, that's real jam! Don't you see—while Kammerer is knocking off your two be-oo-tiful nobs, the Bishop can be putting on his lawn sleeves, and I can be getting into my tights.

(*Scene closes in upon the arrangement.*)

* * *

Correspondence.

MR. CROOKES'S DISCOVERY.

Sir,—It is with the greatest diffidence that any one, as a rule, ventures to find fault with an article by an Editor; but there are occasions when natural modesty has to be overcome for the sake of truth. In your last issue you headed an article "Mr. Crookes' Great Discovery in Physics"; it stands in large type, and has an attractive look upon it, which will probably be destructive to sound science in the minds of those who are but partially up in the subject. It is true that you quote the article in the

Times, but then you endorse it, and thus give it your sanction; whereas in its original place it is well known that it is but a reporter's idea of a scientific subject.

I, too, as well as the writer in the *Times*, went to the Royal Society meeting at which Mr. Crookes read his paper—or, rather, delivered his exposition of the subject; and I own that, like many others, I was led there by the curiosity of seeing a ray of light bent out of its natural course, for I had been previously told that this was to be demonstrated. Mr. Crookes showed us some wonderfully neat experiments, and he broke new ground regarding the free paths of the molecules of gases in vacuo; but I did not see anything absolutely new, except what may be called the molecular shadow. As for the bending of a ray of light, I saw nothing of that. I saw that he repeated a very old experiment, which is well known to all who have worked with Geissler tubes—namely, causing the electric spark passing in vacuo to be deflected by a magnet, and I also heard, to my annoyance, that Mr. Crookes christened the *moving molecules of the residual gas* as molecular light. It would be just as appropriate to call a cannon ball a ray of light, since a flash is seen when it strikes the target.

I will endeavour to explain an experiment which will illustrate my meaning. Sealed in an exhausted tube (that is, exhausted, perhaps, to the 1-1,000,000th of an atmosphere) were platinum wires, to which a coil was attached, and a spark traversed the tube. A certain number of the molecules of residual gas became charged with electricity, and thus became a source of energy, and traversed the tube from the negative to the positive pole, on which was a receiving disc. These molecules being charged with energy struck the disc one after the other, and the energy they carried was converted into heat. Owing to the high exhaustion of the tube, the molecules rarely hit one another in their flight to and fro, as is the wont in gases when less attenuated, and consequently nearly their all force was expended on the receiving disc. The impact generated heat, which was shown by light being produced—not *emissive light, but light obeying the undulatory theory*. The paths of the molecules could be drawn on one side by a magnet, which, as I have said, was known many years ago.

It will now be seen that a bullet when fired from a gun might also be classed under the generic term of emissive light, since the effects caused by its impact on a target, and by a molecule on the disc, is precisely the same. The fourth state of matter is also a term which should be spoken of with the greatest caution. The difference between the gaseous and this state consists in the number of molecules present in a given space, and no doubt the theories which have been so ably proved by Clausius and Maxwell in regard to gases may have to be modified to meet the case of Crookes's exhausted tubes. At ordinary pressures, in every cubic inch of air there are somewhere about three with twenty cyphers written after it (3×10^{20}) of molecules present; in Crookes's vacuum there are three with thirteen or fourteen cyphers written after it ($3 \times 10^{13 \text{ or } 14}$) of molecules. So we see that still there are a goodly number of molecules present even in such a vacuum as that experimented with.

I have now given my protest against calling the result of Mr. Crookes's researches a *great discovery*, but I wish, in conclusion, to bear record that all the experiments with which we were favoured were beautiful illustrations of ingenuity, and that they demonstrated to a nicety all the *facts* that the author wished to bring before his audience. No one has a greater regard for Mr. Crookes's high scientific attainments than myself, but I think he is wrong to give to any phenomenon a name which may mislead. The fact that the phantom of the corpuscular theory of light has been raised in your columns gives colour to this opinion.—I am, sir, yours, **Censor.**

PRICES IN PHOTOGRAPHY.

Sir,—In your last number Mr. Sutcliffe favoured us with a few facts as proof that you were wrong in your article when comparing the charges made in this country against those of Paris and other cities. Mr. Sutcliffe must be aware that most of the leading studios in Paris give their patrons pictures taken with a very dark background, and printed usually in ovals with a tinted margin, finished very nicely with a collodion surface. Now it so happens you were correct in your estimate, for one guinea is our charge for a dozen cartes finished in the same way.

We are obliged here to give our customers different pictures, at prices to suit their means, and a simple vignette picture is not half the trouble to produce. And is it very creditable to the photographers of this country, that they do not make one uniform rate for all cartes, whether large heads, Rembrant effect, or full figures?

Mr. Sutcliffe's remark about pictures is particularly unfortunate. One would suppose all would be aware of the fact that pictures are not less valuable because they may be purchased by their fortunate possessors cheap. What was the amount given for Miss Thompson's first production, and what were some of the old masters worth fifty years since, compared with what they would now be sold for?

Leamington. R. L. G.

FERRIC OXALATE.

Sir,—At the last meeting of the Photographic Society Captain Abney made a statement to the effect that ferric oxalate was one of the earliest photometers, having been used "by Draper about 1840." I am not aware that this salt was ever used by Draper as a photographic agent. The first use of organic iron-salts in photography was by Sir John Herschel, who used the citrate and tartrate, but *not the oxalate*, which is far more sensitive to light.

The *first photographic* experiments with ferric oxalate were made by Dr. Phipson in 1860 and 1861, afterwards by Prof. Reynolds, and then by Mr. Willis. They have been all duly recorded in the pages of the Photographic News.—I am, sir, yours truly, Historicus.

"GIVE UNTO CÆSAR, ETC."

Sir,—In a recent number of the Photographic News you published a paragraph on the dangers of impure iodide of potassium purporting to have been taken from the *Scientific American*. Allow me to state that that paragraph was published originally in an English journal, *The Monthly Magazine of Pharmacy, &c.*, and that, like many other useful items of information from that periodical, it has been taken without acknowledgment by your transatlantic contemporary. By all means, as your correspondent W. B. D. suggests, let us have what all Englishmen delight in, namely, fair play.—I am, yours, &c.,

The Author of the Paragraph in Question.

THE BOISSONAS' EXTRA RAPID PROCESS.

Sir,—Wishing to render to my collegues the service I should like the them to render occasionally to me, I feel myself obliged to warn them that Mr. Klary is no longer my agent, and does not represent me in any way.

Those photographers who have treated with Mr. Klary can send me the letters proving their relations or engagements with him with the date of their engagement.

I shall send later to them a little book containing my last formulæ; and, what I consider as more important, many indications and recommendations indispensable to obtain the rapidity I obtain myself.

In doing so I will prove to them how much I wish to be of use to them, in order that they may keep a good remembrance of our relations.

Those photographers who will send to me their name and address free, will in exchange receive free a selection of photographs taken instantaneously and printed in photo-lithography.—Believe me, yours faithfully,

H. Boissonnas, Photographer, *Geneva, Switzerland.*

THE LUXOGRAPH TESTIMONIAL.

Sir,—It has ever been my policy as well as my endeavour to avoid entering the arena of controversy, which I am now most reluctantly compelled to do, owing to the extraordinary statements, in your last issue, of Mr. Robert Faulkner, the eminent photographer, a gentleman whom, until now, I had held in high esteem. If he considers that he has suffered in status by my having stated that he was in my company when we both visited the office where we saw the pleasing illustrations of the now-a-day indispensable Luxograph, will he permit me to apologise very humbly for wounding his susceptibilities?

But to come to the facts. Unless I have entirely lost my knowledge and appreciation of the English language, Mr. Faulkner really did express his admiration in terms so very unmistakable that I myself (further fortified by the fact of Mr. Gregson ordering an apparatus there and then) was induced thereby to intensify the decision at which I had arrived regarding the desirableness of ordering three of these instruments, one for each of my studios.

Nor was Mr. Faulkner's enthusiasm very short-lived, for I am assured that his assistant, Mr. Ross, who was also present at the demonstration of the evening in question, was sent by Mr. Faulkner, and actually waited subsequently upon the patentees of the Luxograph, to negociate terms for the apparatus.

That the Luxograph is a great success is plainly evinced by the evening demonstrations to an ever-increasing number of delighted photographers who come from all parts of the country to see, to approve, and to order.

I think it is a great boon to us all, and without expatiating upon the superiority of the Luxograph over any existing apparatus to photograph by artificial light, let me advise my brother artists to go and see it, and judge for themselves.—I am, &c., Lombardi.

Talk in the Studio.

Christmas Cards.—We have been favoured recently with many examples of photographic Christmas cards which are very excellent. Mr. and Mrs. Glen Payne, of Aylesbury, send us some very charming groups of flowers skilfully arranged, and accompanied by Christmas, New Year, and birthday greetings. These all form admirable greeting cards of a high order. Those who have visited the Photographic Exhibition the last few years will remember Mrs. Payne's charming grouping and photographing of flowers and plants. The "Old Hand" recently described some capital modes of applying photography to seasonable cards. Mr. C. H. Evans, of Chippenham, sends us some very good examples of portraiture, surrounded by wreaths and scrolls, with words of greeting. A pretty idea the greeting and portrait of the sender! Messrs. Field and Co., of Putney, utilize the Christmas card by printing on some very pretty one their address, and at the back their scale of prices. These will doubtless find ready means of distribution and of preservation.

South London Photographic Society.—The first meeting for the session, 1879, will take place on Thursday, January 2nd, in the rooms of the Society of Arts, Adelphi, at eight o'clock, when the evening will be devoted to a lantern exhibition—principally views of the Paris Exhibition—by Mr. F. York. Further information can be obtained from the Hon. Sec., H. Garrett Cocking, High Road, Lee, S.E.

Stereoscopic Printing.—A correspondent of our Philadelphia contemporary says:—"I send you a little dodge in the printing line, which I find useful in making prints from stereoscopic negatives, and by which cutting and transposing either the prints or the negatives are saved. In the first place, I have a bottom line on my negatives, which can be made by pasting a narrow strip of paper, or drawing a clear line with a sharp knife on the base of the negative; and which serves as a guide for cutting away the edge of the print. Next cut your paper in strips, suiting the *width* of your negative, and just *twice* its length. Have a piece of smooth, thin, opaque paper, just the exact length of the negative, draw a vertical line on this in the centre; lay your paper, albumenized side out, on this mask, making the ends to meet at the line; now print first on one side and then on the other, taking care to have the base lines correspond; and when the print is made, cut the paper in the centre, and it is already matched, transposed, and ready to have the corners trimmed either round or square, and mounted. My silvering solution is simply plain silver, about forty grains strong, with four drops of concentrated ammonia to the quart, and when it gets the least out of order I just give it a good boiling, and bring it up to the proper strength. I find by experience that this is the simplest and most reliable of all silver solutions for paper. There is no foreign matter in it that will not come out by boiling. Let others try it and be satisfied."

To Correspondents.

Received too Late.—Owing to the necessity of going to press early, several communications arrived too late for insertion this week.

Maidstone.—You have the sole right of publishing prints from any negative which you have produced for your own purposes, and not as a commission or order from some one else. If you, for instance, engage a model to sit for a picture you have designed, or if you obtain the consent of any person, public or private, to sit for you for your own purposes, you will possess a copyright in such negatives. To secure the copyright and acquire a right to defend it at law you must register it at Stationers' Hall.

C. H. Evans.—Many thanks. We shall be pleased to receive details of your mode of working the cards in question. We notice them in another column.

W. W.—We do not find any examples in your letter. Your general plan of working seems careful, and should secure a fair degree of permanency. One ounce of hypo to eight of water is, however, too small a proportion. We prefer one to four, immersing about fifteen minutes, the solution being at a temperature of not less than 60°

B. S. F.—All the prints by Mr. Willis's process which we have seen were produced in platinum, and of a black tone. The best were an intense neutral black, some of a bluish or greyish black. We see no reason to doubt their permanency. The process is patented.

Enquirer would see in our last the full details which Mr. Willis gave at the Photographic Socity, beyond which we have no information. It must be remembered that the process is patented, and licencees will doubtless receive fuller information.

L. C. E.—For group purposes we should select No. 6 in your list. If for landscapes and architectural work as well, then No. 5. The price of our Year-Book by post is one shilling and twopence. Payment may be sent in postage stamps.

Old Subscriber.—It is very difficult to obtain a brown tone in developed collodion prints. We have occasionally secured such a tone, but it cannot be secured by any specific formula. A newish bath in good condition, and pyro developer with acetic acid, with very nicely-timed exposure, full time without such over-exposure as will cause flatness, and rapid development, will sometimes succeed. Collodio-chloride, or pigment printing, will secure it. Toning the collodion image with permanganate of potash gives a brown tone. 2. Carbon may be used for enlargements in the camera, but it would require a very long exposure. Producing an enlarged negative is the best plan. There is no work on the subjects you name.

M. F. D.—There is no secret formula required to obtain a rich intense black tone in prints. The most important thing is a good intense negative. Print deeply, and tone with almost any of the popular gold baths—that known as the time in preference. Leave the prints in this bath until they acquire a deep black tone. If removed too soon from the gold bath, they will acquire a purple tint in the hypo.

Several Correspondents in our next.

PATENT OFFICE LIBRARY

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